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Increasing Production by Good Lighting

One-Eighth More Pieces Inspected Per Man-Hour When Illumination Is Brought Up to Requirements

BY FRED L. PRENTISS

EXTENSIVE tests were recently made at the Columbus, Ohio, plant of the Timken Roller Bearing Co. in an effort to establish the relationship between illumination and production in the inspection department. During the test period, lasting for ten weeks, 7,313,323 pieces were inspected and interesting data were secured that seem to prove that, for this class of work, production was materially increased by a well-designed system of illumination and these showed that production increased with each increase in illumination. With the maximum illumination used in the tests the production increase was 12.35 per cent and the total cost of lighting was less than 2.5 per cent of the payroll.

The tests were conducted in the green inspection department, where cups in various sizes, cones and threaded cones used in making roller bearings are inspected after leaving automatic screw machines and before heat treatment. The work is carried on by three groups of inspectors. The first group gages the material for diameter and depth. The second inspects for defects such as chatter, tool marks, ingot breaks, thin ribs and bad chamfer. The third group inspects for imperfections on the tread on the inside of the cones, bad milling and chamfering operations and inadequate burnishing. Some of the work, such as the inspection of threaded cones, ingot breaks and chatter marks requires close visual inspection, while in some of the gaging which is done by indicating and limit gages relatively little is required of the eyes.

The personnel of the department at the time of the tests consisted of an average number of 44 inspectors, the number varying slightly each week. The green inspection department occupies a space approximately 30 x 60 ft. in a large sawtoothed roof type factory building.

At the beginning of the test the lighting system in this department had six outlets, four of which were equipped with 200-watt clear lamps and two with 150-watt lamps. The six lamps had enameled steel reflectors and gave an average illumination of about 2 foot-candles. The distribution of light, however, due to wide and irregular spacing of units, was uneven and caused bad shadows. The department is so located that it receives daylight from windows at a distance on one side and from skylights in the sawtooth roof. During the greater portion of the first two weeks of the test the lighting system as above described was supplemental to the natural daylight. The resulting average illumination in the test session for this period was approximately 5 foot-candles.

The new lighting system consisted of 28 Glassteel diffusers located on 8 x 10 ft. centers and mounted 12 ft. from the floor. This type of lighting unit has a globe that incloses the lamp, producing an even distribution of light with soft shadows and a noticeable absence of objectionable specular reflections. To maintain the levels of illumination as uniform as possible, the skylights of the sawtooth roof were blackened during the tests made with the improved artificial illumi-

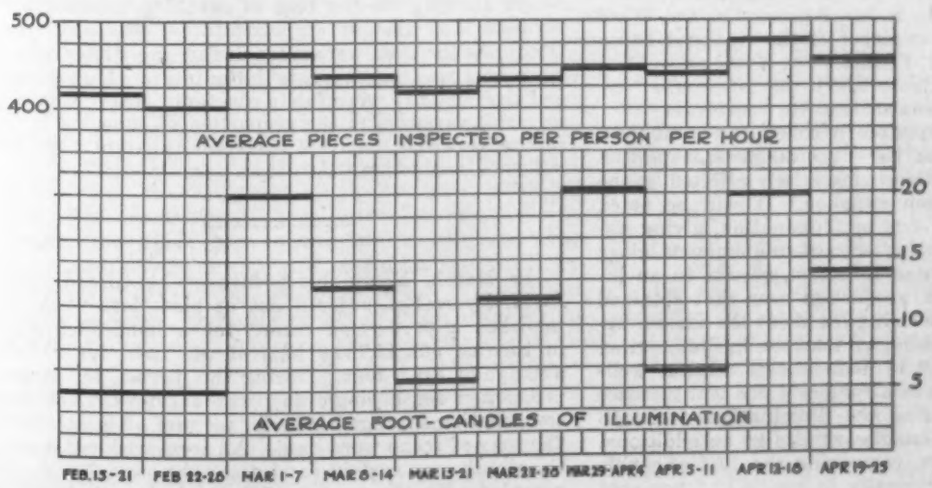


Fig. 1 — Improvement in Output Followed Each Addition to the Effectiveness of the Lighting and the Gain Was General, the Diagram Showing the Average in Each Case Over an Entire Week and for the Entire Inspection Force

nation. The tests included taking production records with the use of the old system and with 6, 13 and 20 foot-candle systems and the ten weeks was divided into ten test periods. The table shows the total number of pieces inspected, the total inspection hours and the average number of pieces inspected per person per hour, during each of the ten weeks of the test. Each line represents one week.

Foot-Candles		Total Pieces Inspected	Total Inspection Hours	Average Pieces Inspected Per Person Per Hour
5.0	(Old System)	684,164	1,644	415
5.0	(Old System)	581,709	1,449	400
20.0	(New System)	681,621	1,476	462
12.8	(New System)	708,559	1,620	437
5.7	(New System)	739,627	1,778	415
11.9	(New System)	735,316	1,698	432
20.2	(New System)	763,762	1,737	440
6.2	(New System)	809,631	1,866	434
20.2	(New System)	842,138	1,783	472
13.5	(New System)	766,796	1,700	451

"The current consumed with the 20 foot-candle system amounts to 8.4 kw., which, at a rate of 3c. per kwhr., results in a cost of 25c. per hour for current, to which should be added approximately 7c. for lamp renewals and other charges, making a total cost of 32c. per hour. With the old 5 foot-candle lighting system, about half of which was daylight, the cost for current and lamp renewals was 4c. per hour. The inspectors receive an average wage rate of approximately 30c. per hour or, for 44 people, a total of $13.20 per hour. A 12.5 per cent increase in production means, therefore, a saving of $1.47 per hour in labor, which is nearly five times the added cost of the lighting. To put the matter in another way, the new lighting increased the production 12.3 per cent at a cost of less than 2.5 per cent of the payroll."

The results of the test are shown graphically in the accompanying charts. Fig. 1 shows the weekly rate

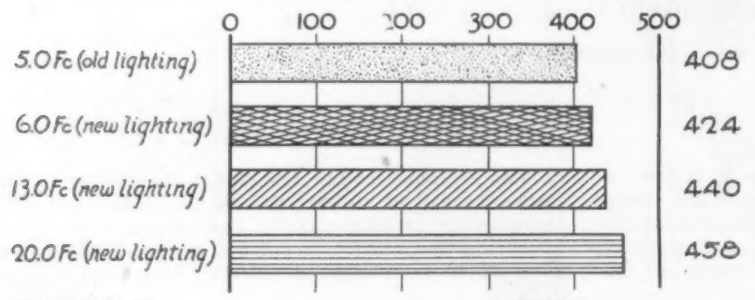
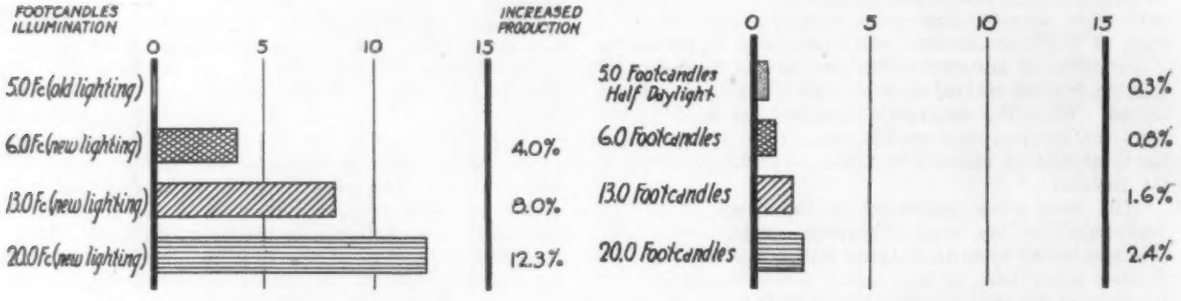


Fig. 2—(Left) Average Production Under Each Lighting System and Intensity

Fig. 3—(Lower Left) Percentage Increase in Production Over the Old Lighting System, Showing How the Increase Develops with Greater Intensity of Light

Fig. 4—(Below) Cost of Light in Percentage of Payroll, Showing That the Highest Type, Producing One-Eighth More Work, Costs Only One-Fortieth of the Payroll



The increase in the average production as well as the percentage of increase are shown below.

	Average Pieces Inspected Per Person Per Hour	Increase Per Cent
20.0 Foot-Candles	458	12.3
13.0 Foot-Candles	440	8.0
6.0 Foot-Candles	424	4.0
5.0 (Old)	408	..

These tests were the subject of a paper on "The Relation of Illumination to Production," presented before the last annual convention of the Illuminating Engineering Society by D. P. Hess, manager of the Columbus plant of the Timken Roller Bearing Co. and Ward Harrison, illuminating engineer of the National Lamp Works of the General Electric Co., Cleveland. The authors of this paper, from which the information regarding the tests is gleaned, state in conclusion:

"The tests furnish apparently conclusive proof that, for the class of work carried on in the green inspection department, the production is materially affected by the character of illumination supplied. It will be noted that a well-designed system of illumination, giving approximately 6 foot-candles with a minimum of glare and objectionable specular reflection, results in an increase of 4 per cent in production over that obtained under a faulty system which gave about the same average foot-candles. Likewise, an increase in illumination from 6 foot-candles to 13 foot-candles with a well-designed system results in a further 4 per cent increase in production. Increasing the illumination from 13 foot-candles to 20 foot-candles results in an additional 4.3 per cent increase, or, comparing the 20 foot-candle system with the one originally in use, a 12.3 per cent increase in production is found.

of production for the entire period and indicates how production increased with the increase in illumination. Fig. 2 shows average production under each lighting system. Fig. 3 shows the percentage of increase in the production and Fig. 4, the cost of light in percentage to the payroll.

In an effort to obtain data as to whether atmospheric conditions materially affect the output of factory worker, wet and dry bulb thermometer readings were taken four times a day and from these the relative humidity was calculated. The daily weather bureau record showing the per cent of sunshine, exterior temperature and amount of precipitation was also tabulated. As the tests were made during the winter season when heat was necessary, both the interior temperature and the humidity were fairly constant. There was considerable variation in the proportion of sunshine in the successive weeks, but this variation apparently did not influence production.

In March, Mattie blast furnace at Girard, Ohio, A. M. Byers Co., ordered out of blast last week, established a production record for a hand-filled stack in turning out 14,783.9 tons of pig iron, for a daily average of 476.9 tons. During this period, the largest production for a single day was 511 tons. The coke consumption averaged 1918 lb. per ton of metal, while 250 tons of scrap were used. All iron produced during the month was cast in sand and only one off-cast was recorded. The furnace is 85 ft. high, hearth 15 ft. in diameter and the stock line 65 ft.

Pittsburgh Basing Is Strongly Denounced

Examiner Bennett's Report Calls Custom an Artificial Practice in Violation of Economic Law and Not Compatible with Free Competition— Denies Chicago District Is Center of Underproduction

THE Pittsburgh basing point practice was not the result of the law of supply and demand functioning in a free, competitive market, but was a practice adopted as part of the sales policy of the United States Steel Corporation because it was to its best immediate business advantage to do so. This epitomizes the findings of Trial Examiner J. W. Bennett, in a comprehensive report recently submitted by him to the Federal Trade Commission. This document, comprising 302 single-spaced type-written pages, besides 43 pages of addenda, deals only with the facts of the case and gives no opinion as to whether any statute has been violated.

In dealing with the economic phases of the case the examiner first carefully defined economic terms and economic facts necessary to a full understanding of the charges in the complaint and the allegations in the answer. On this basis he concluded that Pittsburgh plus was an artificial practice inhibiting free and unhampered competition. In his opinion, the contention that the Chicago district is a center of underproduction favoring the natural development of higher prices than at Pittsburgh, a point of surplus output, is not substantiated by the facts. Large quantities of steel have been shipped from Chicago to points east and the largest market for finished steel is still east of the Chicago mills. Price exhibits, in the examiner's opinion, establish a close adherence to the Pittsburgh plus practice by Chicago producers as well as other mills and the evidence indicates that this adherence was first dictated by associations, agreements, pools and understandings and latterly by the immediate business advantage to the independents or their fear of punitive measures. Artificial methods of establishing prices dating back as far as 1873 are covered in considerable detail. Frequent references are made to the Gary dinners, and the methods supposedly resorted to since the abandonment of those meetings are also outlined.

Separate sections of the report are devoted to a review of the testimony of consumers of bars, plates, structural shapes, sheets and wire products to show that the Pittsburgh basing point practice lessened competition and discriminated between different purchasers from the United States Steel Corporation. The examiner adds, however, that evidence in the case fails to indicate a systematic application of the Pittsburgh plus practice to billets, wire rods, sheet bars, angle bars, tie plates, car wheels, spikes, forgings, armor plate and steel piling, nor methods of selling such products which substantially lessen competition in their sale in interstate commerce. With reference to tubular goods, he states that the evidence fails to demonstrate that such products are made in the Chicago or Birmingham districts in sufficient volume to supply the consumption in those territories, nor to show specifically that the Pittsburgh plus practice, in the circumstance, has substantially lessened competition in those products.

Economic Definition of a Truly Competitive Market

IN defining economic terms necessary to understanding the issues of the case, the examiner said, in part:

"Any truly competitive market price of any commodity is substantially uniform and nondiscriminatory at the point of sale, which, for a manufactured article (economically speaking) is always the point of production and shipment unless the product is transported physically to another location and there sold. Dumping and the discriminatory prices involved are economic indications of the failure or hampering of free competition. Free competition and discriminatory prices are incompatible. Discriminatory prices attempt to meet competition at one point by evading competition at others. Higher prices maintained in a restricted sales territory about a market or center of production, while lower prices are made in outside territory, are monopolistic prices intended to get all the traffic will bear after competition has been declined.

"A monopolistic market (economically speaking) is a market in which the factors of free competition are not fully functioning. Any agreement of minds of traders that leads them to maintain prices rather than to compete interferes with competition. Uniform delivered prices are not uniform market prices in the economic sense, where the points of destination are at different distances freightwise from the points of shipment.

"Fixed and uniform price differences between markets or between producers indicate controlled markets. Slight or irregular variations lacking in fixedness or uniformity are not such an indication of controlled markets.

"In an industry like the steel industry it is improbable that perfect uniformity of mill base prices of all producers in a market would result, since no steel market has the perfection in this respect of a speculative exchange market. It is certain, however, that when prices of any given producer to his own customers vary materially, f.o.b. mill, there are not conditions of full and free competition.

"It must be fixed firmly in the mind in drawing economic conclusions in this proceeding, that the uniform price which free competition tends to make is the f.o.b. realization price of the sellers, but evidence in this proceeding shows that when rolled steel was being sold in accordance with the Pittsburgh plus practice, prices of producers outside the Pittsburgh district, reckoned f.o.b. realization, varied widely, depending upon the location of the producer and of the buyer, while each producer reached any certain customer at a uniform price. This is a double indication that the practice was not compatible with free competition."

Dumping Denotes Failure of Free Competition

The alleged failure of Chicago producers to sell in unhampered competition is touched upon as follows:

"Instead of decreasing base prices in Chicago and meeting the requirements of the territory tributary to Chicago by location, the Chicago producers, when pricing and selling rolled steel in accordance with the Pittsburgh plus system, have kept up their prices in the immediate territory and adopted the practice of dumping to get rid of their surplus production."

Defenders of the Pittsburgh basing point practice as applied to Chicago mills have urged that it was the natural economic consequence of underproduction in the Chicago district. The examiner in his report takes the opposite view and cites the fact of a surplus production there. He says, in part:

Surplus of Rolled Products in Chicago District

"AT all times since 1910, except at short intervals of peak demand, when rolled steel was sold in accordance with the Pittsburgh plus practice, there has been a surplus of rolled steel produced in the Chicago district at prevailing prices for delivery from plants in the Chicago district. What territory might be supplied by steel producing plants in the Chicago industrial district running to full capacity under full and free competitive conditions, or what might be the demand for steel from such plants under full and free competitive conditions, has not been determined by the evidence offered in this proceeding. Whatever the conditions may have been as to Chicago district production or demand, the Pittsburgh plus practice of pricing and selling rolled steel was an important factor in bringing it about. Such Pittsburgh plus practice prevented full development of the steel industry in the Chicago district, but to what extent it prevented such development cannot be accurately determined by the evidence in this proceeding. The same is true of the Birmingham industrial district, the Cleveland industrial district, and the Buffalo industrial district.

"The Birmingham industrial or producing center has been hampered in all the years of its existence as a producing center of rolled steel except in times of peak demand, by reason of difficulty of finding an adequate market for steel products there produced.

"Assuming that there was free and full competition in the rolled steel producing industry for the past several years, evidence in this proceeding does not show that there was a shortage of steel production to meet demands in Chicago and Western territory as compared with Pittsburgh territory at the times that rolled steel was being sold by Chicago producers in accordance with the Pittsburgh plus practice. Sellers' markets due to surplus demand occurred in but few of the 15 to 20 years that the Pittsburgh plus practice was followed in the West in the sale of plates, shapes and bars and of the 20 to 23 years that the practice has been followed on wire and wire goods, sheets and light plates. Generally there was surplus capacity, if not production, in the Chicago district at the times when rolled steel was being sold in accordance with the Pittsburgh plus practice.

"Chicago and Western mills so designated by respondents shipped into Eastern territory as designated by respondents, 583,604 tons of rolled steel in the high-demand year of 1920. According to uncontradicted testimony of economists, that indicated a surplus in the Chicago district at the prices then prevailing, so far as that steel was sold in accordance with the Pittsburgh plus practice, and so indicated a lack of free competition in the steel industry.

"In submitting the supply and demand statistics, respondent assumes that the steel produced in the Eastern district as delimited by them, is produced in Pittsburgh. Otherwise, while it might serve to cause Chicago prices different from the Chicago f.o.b. mill prices, it could not serve to cause Pittsburgh plus prices. As a matter of fact, less than one-fourth of the rolled steel of the country is produced in Allegheny County, and the major fraction of the Eastern steel is distributed among points as distant as Cleveland, Columbus, Wheeling, Buffalo, Philadelphia, Bethlehem, Youngstown and Birmingham.

"Western producers have been kept out of the best sales territory, for the largest demand for primary rolled steel products is still in the East. In fact, rolled steel consumption probably amounting to one-half of that of the entire country takes place east of a north-and-south line coinciding with the Ohio-Pennsylvania boundary, but respondents, in Exhibits 491 and 494, are silent upon this point, as they are on shipments to Eastern territory except from Chicago and the West.

"Testimony in the case tends to show that in years of great demand all steel producing points are overloaded with business and all are behind in their deliveries. It is doubtful if Chicago producers are more behind with their deliveries than are Pittsburgh producers at such times.

Chicago Would Be Quantity Production Center Under Free Competition

"GARY, IND., is admittedly the surplus production point of the corporation mills upon blue annealed sheets, and from that point is supplied much of the trade of the corporation in such product further east. This has not led to the abandonment of the Pittsburgh plus practice in the sale of blue annealed sheets. In fact, there seems to have been no real connection between surplus production or surplus capacity or the lack of it and the functioning of the Pittsburgh plus practice.

"It goes without saying that the Pittsburgh plus practice was not followed so strictly in times of slack demand as it was in prosperous years, but this is notoriously the history of any device tending to a lessening of competition or a uniformity of prices."

Testimony as to comparative costs of Steel Corporation plants in various districts is reviewed by the examiner. He concludes that under free competition Chicago would become the quantity production center for the country. He asserts, in part:

"Chicago could sell most of the products if it indulged in price competition with Pittsburgh as far east as Pittsburgh and still make the same profit that Pittsburgh would make. In some cases, it could, upon a strictly price competitive basis, drive Pittsburgh out of all markets in the country. Evidence in the record indicates that this condition lasted for years. Under free competition Chicago would in the long run become the quantity production center for the country in competition with Pittsburgh.

"Producers were not on the same competitive basis. Pittsburgh producers had a country-wide sales territory, while producers outside Pittsburgh had restricted territories.

Charges Discrimination as Between Purchasers

"Purchasers were not treated alike. Purchasers from Pittsburgh were systematically given lower prices than purchasers elsewhere, no matter what point furnished the product.

"Purchasers from the same producer outside Pittsburgh were compelled to pay different prices for their goods.

"Prices at Chicago were not reduced toward the cost level. Purchasers served by the lowest-cost plants paid the highest prices for the goods bought.

"Dumping and discriminatory prices were resorted to outside Pittsburgh as soon as surplus developed at any outside production point.

"Purchasers were not given the benefit of low production costs, which from the standpoint of public interest is the chief function of price competition.

"Uncontradicted evidence shows that fabricator purchasers served by Chicago producers have their sales territory curtailed seriously when rolled steel is sold by producers in accordance with the Pittsburgh

plus practice, and that fabricator purchasers served by Pittsburgh and Eastern producers at such times have free access to all territory in the United States upon practically the same price basis as the Chicago and Western fabricators. Such curtailing of such fabricators' sales territory has reduced their demand for rolled steel raw material and has tended to prevent the development of the steel industry in the section in which Western fabricators are doing business. Such lack of development, and this is considered a fact thoroughly established by the evidence in this case, is due in a measure at least to the sale of rolled steel in accordance with the Pittsburgh plus practice. It could not therefore be a justification for the Pittsburgh plus practice, since the Pittsburgh plus practice is a factor which has effected a curtailing of competition and a preventing of such industrial development as might have occurred under free competitive conditions. It is therefore a sales practice inimical to public policy.

"For these and other reasons disclosed in the record, the examiner has concluded that to the extent that steel has been sold in accordance with the Pittsburgh plus practice there was no free competition in rolled steel and no price competition at all.

How and Why Pittsburgh Plus Was Adhered To

"THE Pittsburgh plus practice was not the result of the law of supply and demand functioning in a free, competitive market, but was a practice adopted as part of the sales policy of respondent corporations and in accordance with the best immediate business advantages of such respondents.

"Between 1899 and 1904 it was adopted as a constituent element of price-fixing understandings or agreements among producers, to which understandings or agreements respondent corporations were parties.

"When the Pittsburgh plus practice was adopted respondent corporations dominated the steel industry even to a greater extent than at the present time.

"They dominated the steel industry in the Pittsburgh industrial district to a greater degree than elsewhere.

"When respondent corporations produced about 73 per cent of the steel in the Pittsburgh industrial district, a practice which was to the advantage of steel producers in such district was to the advantage of respondent corporations. The Pittsburgh plus practice was of advantage to Pittsburgh steel producers and to respondent corporations.

"Respondent corporations dominated the steel industry in the Pittsburgh district from a production standpoint. Pittsburgh district dominated the steel industry in the United States from a production standpoint between the years 1901 and 1904. The Pittsburgh plus practice had a capacity and tendency to perpetuate that condition.

"The Pittsburgh plus practice also had a capacity and tendency to cause the Pittsburgh industrial district to dominate the steel industry from a merchandising standpoint. The Pittsburgh plus practice had a capacity and tendency to aid respondent corporations to dominate the steel industry from a merchandising standpoint and to extend the sales policy of respondent corporations to the rolled steel industry in the entire country. It also tended to prevent the activities of independent producers from interfering with or terminating that dominance or that policy.

"After the lapsing of the Gary dinners, the Pittsburgh plus practice was observed as a practice by respondent corporations, who were in this respect generally followed by other producers.

"Other producers had knowledge of respondent corporations' prices and of the fact that they were selling in accordance with the Pittsburgh plus practice. Such knowledge had the capacity and tendency to take the place of specific price understandings and to bring about uniformity in quoted and delivered prices, and to curtail price competition.

"Producers independent of respondent corporations knew of respondent corporations' prices and whether they were selling in accordance with the Pittsburgh plus practice, and they generally followed these prices.

Pittsburgh Plus Advantageous to Pittsburgh Independents

"IT was to the business advantage of Pittsburgh producers to follow the prices of respondent corporations and not interfere with the Pittsburgh plus practice. It gave them a sales territory coextensive with the United States and protected Pittsburgh producers from price competition in territory contiguous to Pittsburgh, on an equal footing with producers outside the Pittsburgh industrial district.

"Departure from the practice by rolled steel producers independent of respondent corporations placed such Pittsburgh producers at a disadvantage in price competition, not only with independent producers with plants at production centers outside the Pittsburgh industrial district, but also with respondent corporations which had plants at these centers. Respondent corporations had branch plants at production centers other than Pittsburgh, while other Pittsburgh producers had not, and abandonment of the Pittsburgh plus practice tended to shut Pittsburgh industrial district independent producers out of the sales territories contiguous to other production centers which they reached on an equality when the Pittsburgh plus practice was followed. Such conditions resulted in the practice generally being followed by respondent corporations as well as by rolled steel producers in the Pittsburgh industrial district independent of respondent corporations.

"Respondent corporations' plants in producing centers other than Pittsburgh were usually dominant in these production centers, or at least the largest single interest in the center, as in the case of Chicago, on plates, shapes, bars, wire, sheets, etc., and in the case of Birmingham, on such rolled steel materials as were produced in that district, and in the Cleveland production center, on all steel wire and wire products.

"No producers independent of respondent corporations had in such production centers outside the Pittsburgh district the natural advantage of location against respondent corporations that they had against producers with plants in the Pittsburgh industrial district only. Against the latter the freight charge from Pittsburgh to the other production center, such as Chicago or Cleveland, gave such protection as permitted a Chicago producer to build up a local business against Pittsburgh if his selling costs (costs of placing the product already sold f.o.b. car Chicago) were approximately equal with Pittsburgh competitors' or even more than those of Pittsburgh competitors if still not in excess of the Pittsburgh cost plus the freight charge.

"Respondent corporations' plants at Chicago, however, had all the advantages which the Chicago location gave to independent plants in price competition. The same was true of other producing centers where respondent corporations had such plants.

"In addition, there was a conviction among independent producers in Chicago and Birmingham, at least, and probably elsewhere, that respondent corporations, with their more complete integration and other advantages, were the low-cost producers in these centers, and on a basis of price competition could and would drive independent local competitors from business, at least in standard lines or quantity production. This conviction was held also by officers of respondent corporations and expressed publicly at times. It was also made known by such officers that respondent corporations would punish price cutters and on some occasions respondent corporations actually did so, in cooperation with other producers who were not involved.

"Producers of rolled steel independent of respondent corporations located east of Chicago but west of Pittsburgh, in such centers as Youngstown, Wheeling, Cleveland and Columbus, were given by the Pittsburgh plus practice a protection like in kind to the protection given the steel producers in the Pittsburgh industrial district independent of respondent corporations, but less in degree, when competing with all plants further to the West, such as Chicago or St. Louis or Indiana or Wisconsin plants. It also gave producers of rolled steel products independent of respondent corporations with plants near Pittsburgh but to the east thereof, such as at Johnstown, Pa., an advantage similar to the plants at Pittsburgh in competing with plants of such producers farther east, such as at Bethlehem or Philadelphia.

"This situation made it to the immediate business advantage of independent producers to accept the protection against price competition offered by respondent corporations in their adherence to the Pittsburgh plus practice.

Outside the Pittsburgh District

"Producers outside the Pittsburgh industrial district independent of respondent corporations did adopt and adhere to the Pittsburgh plus practice and did follow prices of respondent corporations, as a general rule, probably on 90 per cent or more of the products sold in accordance with the Pittsburgh plus practice.

"In following the Pittsburgh plus practice, prices of respondent corporations were regarded as minimum prices, and there was no objection voiced to any producer's getting higher prices for his products. Getting prices above the market prices announced by respondent corporations was not a departure from the Pittsburgh plus practice.

"Respondent corporations were regarded as the quantity producers in their several fields of manufacture. They produced, as a rule, standard materials and avoided specialties requiring exceptional skill or care. While such specialties were produced at plants of respondent corporations, such corporations were not regarded in the trade as specialty producers.

"The Pittsburgh plus practice applied to standard products rather than to specialties. Independent producers in many producing centers gave their attention more largely to specialties, as for instance, Worth Brothers and Lukens on locomotive steel, and Bethlehem on special sections.

"Even when a base price related back to standard material the specialty commanded higher prices. Specialty producers had clients of their own; selling them at higher prices in no way interfered with the Pittsburgh plus practice on standard materials.

"As quantity producers respondent corporations carried big tonnages of unfilled orders, which, since 1902, had not fallen below 2,674,757 gross tons, and had been as high as 11,711,644 gross tons.

"Respondent corporations have not sought premium sales nor quick deliveries. Purchasers from them have been obliged, except in dull periods, to take materials from respondent corporations at the convenience of such corporations. While definite deliveries have been made, it has been at periods when they did not interfere with the regular working program of respondent corporations' plants.

Premium Sales Do Not Disturb Plus System

"PRODUCERS independent of respondent corporations, especially small producers, sought premium sales and premium deliveries, without disturbing the Pittsburgh plus practice or stimulating competition in prices with respondent corporations.

"Many of the variations in prices in the more prosperous years of the steel industry, or the years when demand was greatest, indicated premium prices on tonnage the Steel Corporation could not handle. This was tonnage upon which deliveries were important to the purchasers, and to get deliveries within the times which might suit the customers they were obliged to buy from others than respondent corporations and to pay premium prices. There were times when respondent corporations were out of the market except for deliveries at mill convenience.

"All these conditions and all these factors had the capacity and tendency to extend, support and perpetuate the Pittsburgh plus practice of pricing and selling rolled steel products. Up to July, 1921, with minor exceptions, they had been of sufficient potency to maintain the practice as to the sale of plates, shapes and bars, and they have been of sufficient potency up to the present time to maintain the practice in the sale of sheets, light plates, tin plate, black plate for tinning, wire and wire rods."

Ninety Per Cent of Steel Sold According to Pittsburgh Plus

Adherence to the Pittsburgh plus practice by mills both inside and outside of the Pittsburgh district is substantially demonstrated, in the opinion of the examiner, by exhibits introduced in the testimony. He goes to great length to explain his reasons for accepting the Trade Commission's analyses of these exhibits rather than those of the respondent. With reference to the universality of the practice, he says:

"For 20 years prior to July, 1921, with relatively minor exceptions in the years 1909, 1911, 1912 and in war times, rolled steel plates, shapes, bars, wire and wire products, sheets, light plates, tin plate and black plates for tinning to the extent of about 90 per cent of the entire volume sold, were sold by respondents and other rolled steel producers in the United States in accordance with the Pittsburgh plus practice. To a minor percentage of sales of such products during this 20-year period the Pittsburgh plus practice was not applied; it was not applied, probably, to less than 10 per cent of such sales, and where it was applied it was not applied 100 per cent in every case; that is, there were variations of 5c. per 100 lb. or less in the Pittsburgh base prices upon which the Pittsburgh plus base prices were built up, in 25 per cent or less of such cases. To the extent of these exceptional variations only was there any price competition whatever between producers in the sale of such rolled steel products sold in accordance with the Pittsburgh plus practice. This was an artificial situation and so far as it was adhered to it destroyed price competition, and it was a situation inherent in the Pittsburgh plus practice.

"Analysis of 3700 contract sales prices taken from contracts involving the sales of plates, shapes and bars appearing in Respondents' Exhibits 25 to 44, 129 to 132 and 477 to 480, with IRON AGE prices published in the issues for eight days immediately before or eight days immediately following the date of the contract, showed that 2655, or 71.8 per cent, agreed exactly with THE IRON AGE, while 3417, or 93.4 per cent, agreed exactly or deviated 5c. or less per 100 lb. from THE IRON AGE prices.

"Three thousand seven hundred and nine contract sales prices taken from Respondents' Exhibits 25 to 44, 129 to 132, and 477 to 480 inclusive, compared with the respondent Carnegie company's Pittsburgh base price of steel as of the dates of its contracts, showed that 1982, or 53.4 per cent, of such contract sales prices agreed exactly with such Carnegie prices, and 3404, or 91.8 per cent, agreed exactly or varied 5c. or less per 100 lb. as compared with such Carnegie base prices. Variations of over 5c. and less than 10c. per 100 lb. were noted in 72 such contract sales prices and variations of 10c. and over, in 233 such sales prices.

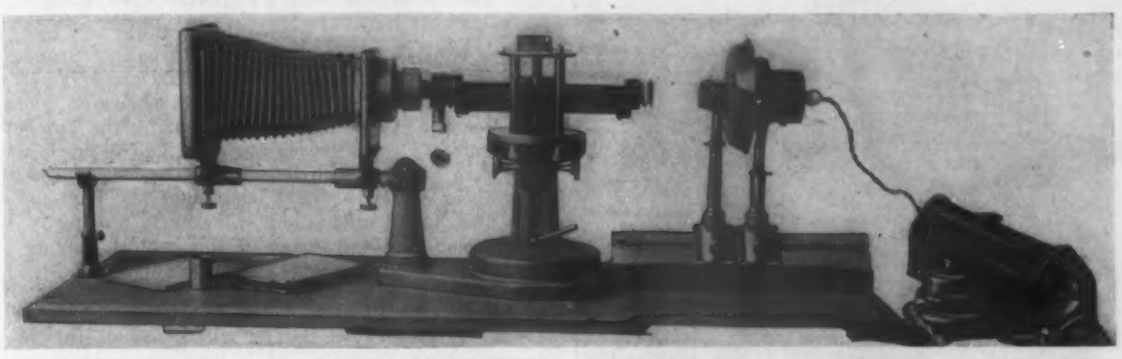
"The examiner feels more confident in accepting the figures arrived at by the commission in this regard, from the fact that more than 90 per cent of all the 400 witnesses who testified in the proceeding as to Pittsburgh plus and price variations, whether for the commission or for respondents, declared that during the period indicated, from about 1901 to 1921,

(*Concluded on page* 1411)

MICROGRAPHS IN THE SHOP

Portable Microscope with Photographic Equipment Simplifies Examination of Metals

The portable Zeiss microscope, described in THE IRON AGE Jan. 31, has recently been considerably improved in its usefulness by the addition of a metallographic camera attachment. With the aid of this addition, the standard portable instrument can be used not only for all classes of laboratory work, but also for the taking of a permanent record of the structure of the material immediately in the shop. The illustration shows the portable microscope with the micrographic addition. The equipment has the Le Chatelier table top on which the specimen to be photographed is placed. The instrument can, however, also be used in connection with the plain flat or ball-shaped table on which small irregular work can be conveniently secured.



Zeiss Portable Microscope with the Photomicrographic Attachment

The microphotographic attachment consists of a base on which all the components are mounted and their positions are secured by means of clamping bolts. A special illuminating tube with an eccentric diaphragm is provided. The illuminating device consists of a lamp containing a 50 c.p. Nitra bulb, a condenser, a slide with ground glass, plate holders and a stationary green filter matching in color the Zettnow filter. This filter is attached to the front rim of the condensing lens. The lamp and condenser are so adjusted that the filament of the lamp forms a narrow vertical line on the diaphragm tube and runs in the direction of an arrow engraved on the latter. The line should include the small opening in the diaphragm.

The image may, for preliminary focusing, be produced on the ground glass pane, the final adjustment being by the aid of a polished pane and a special magnifying lens furnished. The camera is fitted with bellows capable of considerable extension. Plates up to 3½ x 4½ in. may be inserted in the holders. A special arrangement facilitates the finding of the proper time for exposure. Full instructions for manipulation are furnished with every instrument. The Carl Zeiss microscopes are placed on the market by Schuchardt & Schutte, 143 Liberty Street, New York.

Decreased Plant Activities in Pennsylvania Iron and Steel Centers

HARRISBURG, PA., May 5.—The iron and steel market of Pennsylvania is showing a downward trend, according to the semi-monthly report of labor conditions submitted to Dr. Royal Meeker, secretary of Labor and Industry, for the last half of April. The brightest reports are from Philadelphia and Reading.

Johnstown reports that operations in its plants have been further curtailed, plants now working at about 60 or 65 per cent of capacity. Johnstown finds that the demand for workers is very low, and that the supply of applicants for work is heavier than it has been for some time. High class applicants, however, are reported to have no difficulty in obtaining employment. Harrisburg finds the entire market showing a downward trend. The Steelton plant of the Bethlehem Steel Co. reports that No. 3 blast furnace has been blown out and the Bessemer plant closed indefinitely.

Malleable foundries and electrical machinery manufacturing companies particularly have been affected in the Erie region. Williamsport reports its foundries and machine shops operating below capacity, with no indication of an increase in activity. Scranton finds no increase noticeable, and says that there are many skilled workmen who are willing to accept common labor as a last resort.

Philadelphia reports that the first unit of the General Electric Co.'s plant in West Philadelphia will probably start operations July 15 with a working force of 1,000 men. It is planned to increase this ultimately to 5,000 men. This plant will specialize in switchboard manufacturing and assembling.

Reading advises that its rolling mills are working full time. The Bethlehem Steel works is busy, particularly in the nut and bolt department.

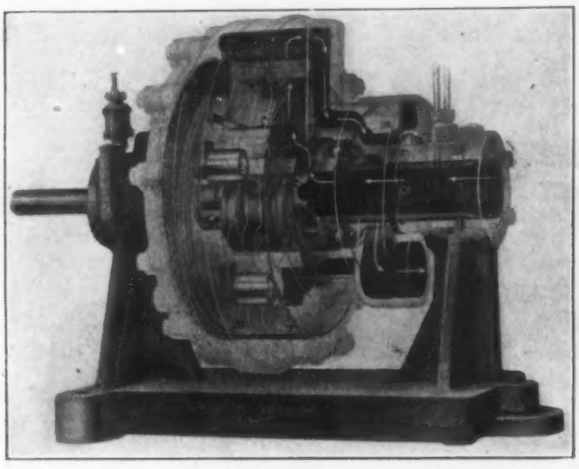
Complaint Against American Can Co. Is Dismissed

WASHINGTON, May 6.—The Federal Trade Commission last Thursday announced the dismissal of its complaint against the American Can Co. The complaint alleged discrimination in price and tying contracts in violation of the Clayton act and unfair methods of competition contrary to the Federal Trade Commission act. Among other things it was stated that the company granted to some purchasers the right to direct it to buy tin plate in the open market prior to the time when the American Sheet & Tin Plate Co. names its prices. It was declared that it was provided in all such contracts that the basic price of cans should advance or decline in proportion as the raw product advanced or declined judged by the official prices of the American Sheet & Tin Plate Co. The allegation was made that this policy allowed certain purchasers to obtain the benefit in price which might result from the right to buy tin plate in the open market prior to the time when the price was fixed and compelled others to forego this privilege and submit to changes in prices based upon the rise or fall of the raw product price.

New uses for aluminum paint are outlined in technologic paper No. 254 of the Bureau of Standards, obtainable from the Superintendent of Documents, Government Printing Office, Washington, at 5 cents a copy. Fifty per cent less heat from the sun will get through the top of an automobile if the top is painted with aluminum paint, the Bureau of Standards finds. Applied on the underside of thin metal roofs aluminum paint was found to cut in half the heat radiated on the underside as compared with surfaces of corroded metal or ordinary paints. On tents and awnings fully 85 per cent of the sun heat that now gets through is found to be shut out.

Crescent Roto-Piston Vacuum Pump

The Crescent roto-piston dry vacuum pump here illustrated in phantom perspective and being distributed by the Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York, is of the rotating piston type. Two main moving members comprise a rotor (or piston) and case which revolve, one within the other, about a fixed shaft at the same angular velocity. The rotor, being smaller in circumference than the case and set off-center to the case axis, is imparted a rolling motion as it describes an eccentric circle at each revolution. This movement maintains, without a liquid seal of any kind, a crescent-shaped displacement of fixed capacity at all times divided by the brass rotor-vane into intake and exhaust spaces



Dry Vacuum Pump of Rotating Piston Type. Short overall dimensions are intended to permit installation where space is limited

which change from nothing to maximum in volume throughout each pumping revolution.

The absence of clearance spaces and valves serves to provide a volumetric efficiency approximating 99 per cent in exhausting to within ½ in. of the barometer. Frictional wear, due to the general design, is considered exceedingly low. Working parts, ball-bearings and bronze bushings are lubricated by a force-feed system, with the exception of the drive-shaft ball-bearing, which turns in compressed grease.

Short overall dimensions allow for installation of the pump in limited spaces where it may be driven from line-shaft or by electric motor, either direct-connected or short-belt drive. This pump has been applied, among other things, for providing high vacua for vacuum chucks in machine shops and for service requiring high vacuum.

President Butler Will Speak at Dinner of National Industrial Conference Board

The National Industrial Conference Board, 247 Park Avenue, New York, announces that the principal speaker at its annual dinner, Hotel Astor, May 15, will be Dr. Nicholas Murray Butler, president of Columbia University, whose general theme will be the relation of government to private business enterprise. It is expected that the address will be heard by 200 of the leading industrial executives of the United States, and be broadcast by radio. Frederick P. Fish of Boston, chairman of the National Industrial Conference Board, will be toastmaster and, following Dr. Butler's address, talks will be made by other members of prominence in the industries.

Both the Metropolitan Paving Brick Co. and the Bessemer Limestone & Cement Co., operating plants at Bessemer, Pa., report improved shipments of cement and brick and better orders. On a recent date, the brick company shipped a trainload of brick from its plant. It is preparing a number of kilns for the manufacture of face brick.

Steel Tank Rates Declared Unreasonable

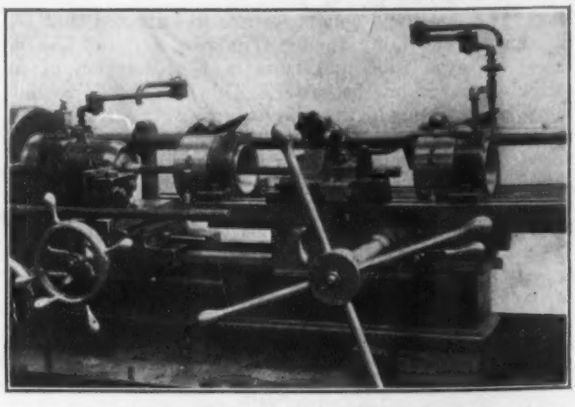
WASHINGTON, May 6.—Passing upon a complaint of the Parkersburg Rig & Reel Co., Parkersburg, W. Va., the Interstate Commerce Commission last week rendered an opinion holding that rates charged on fabricated steel tank material from DeLeon, Leeray, and Ranger, Tex., to Haynesville, La., were unreasonable to the extent that they exceeded 54c. per 100-lb. and that the present rates will be unreasonable to the extent that they exceed contemporaneous rates under the Texas-Shreveport scale on iron and steel articles. The charges which had been collected on the shipments involved were at fifth class rates of $1.17 from Ranger and DeLeon, and $1.24 from Leeray. The complainant was awarded reparation.

Takes Movies of Projectiles in Flight

Motion pictures of projectiles in flight can be taken with a camera developed at the Bureau of Standards. The camera is capable of making 250 pictures per second, but it is believed that several thousand pictures per second could be taken by increasing the number of lenses used. These lenses are arranged to move across the strip of film, each lens taking a picture and then moving on while the next lens takes the next picture. The film, meanwhile, is kept constantly moving in such a direction that the image of the rapidly moving projectile is nearly stationary with regard to it and consequently is not blurred. If the velocity of the film is known the velocity of the projectile can be calculated. It is believed that it will prove useful for determining the velocity of a projectile after it has passed through armor plate. The camera and the experiments made with it are described in technologic paper No. 255 of the Bureau of Standards, copies of which may be obtained from the Superintendent of Documents, Government Printing Office, Washington, at 10 cents each.

Attachments for W & S Staybolt Machines

A forming, a facing and a turning attachment are features recently added to the staybolt machines of the Warner & Swasey Co., Cleveland. As now equipped the machine will turn and face the end of the staybolt



Forming, Facing and Turning Attachments Added to Warner & Swasey Staybolt Machines

before the threading operation, thereby relieving the chasers of the necessity of working on rough scale. This assures longer life for the chasers and also speeds up the threading operation itself.

The forming tool, held on the cross slide, likewise prepares the staybolt head for thread cutting. The threading operations are performed by two die heads mounted on the turret slide and are adjusted so that the threads are in continuous lead.

Several of the machines now in operation are said to be giving excellent results in producing small lots of staybolts, as well as larger lots in continuous production.

COPPER IN SOUTH AMERICA

Local Mining Engineers Hear Chile and Spanish Operations Described

The last meeting of the New York section of the American Institute of Mining and Metallurgical Engineers, which was held at the Harvard Club, Wednesday evening, April 30, was addressed by Prof. Arthur L. Walker, professor of metallurgy, Columbia University, on "Modern and Ancient Engineering and Metallurgy As Observed During a Trip Around the World." At least 60 members and guests attended the dinner preceding the lecture and over 100 heard Prof. Walker deliver the interesting recital of some of his experiences, illustrated in part by stereopticon views. The course which he took was from New York through the Panama Canal and down the west coast of South America, across the Andes and into Argentina and Brazil; from there to Spain and finally through the Suez Canal with India as the objective. His itinerary from India was through China and Japan and then across the Pacific to the United States.

The principal features of metallurgical interest which were described were the copper mines in South America and the Rio Tinto mines in southwestern Spain. Discussing the operations of the Chile Exploration Co. in Chile, Prof. Walker said that this mine is one of the present day metallurgical wonders. Referring to it as a property that had been worked at a loss for years, discarded and hawked around the world and, then taken by responsible parties and worked by a well-planned and simple process, it is now turning out copper cheaper than probably any other mine in the world. A steam shovel is mining by the open-work process 600,000 tons of ore each month with a waste of 400,000 tons. The ore contains 1.6 per cent copper and the recovery is 90 per cent. Mining operations are so extensive that they cover an enormous area and the evacuation is done in benches. He said that he saw one of their largest steam shovels in operation, which had a boom about 85 ft. long and which, instead of loading the rock into cars on the same level, raised it up to a train of cars on a level some 50 ft. above. Its action was like that of a large giraffe raising its head from the ground and poking it over a high fence.

Referring to the leaching operations, the speaker said that these are conducted on an enormous scale in tanks holding 10,000 to 12,000 tons each. The Creator was described as having been very good to the Chuquicamata people in giving them an ore which is readily leached in a country in which there is no rain. Were there much rain there would be no mine, as the copper is largely soluble in water. In addition to this, the ore is more or less porous and does not have to be crushed finer than ⅜ in. as the solution penetrates it in a reasonable length of time to a depth of 3/16 in., making leaching exceedingly easy. Besides these advantages the amount of iron and impurities in the ore is very small, so that the resulting solution is more easily taken care of. The one trouble which they encounter is the presence of chlorine. This is taken care of at present by the addition of fine metallic copper to the solution before it goes to the tank room, thus precipitating cuprous chloride which later is treated for the recovery of the copper.

The mines of the Braden Copper Co. were also described briefly by the speaker, the illustrations revealing the engineering problems involved in building the works and the town on the steep mountain sides.

The Rio Tinto mines in the southwestern corner of Spain, near Huelva, Prof. Walker said, are now being actively worked under English auspices, having been sold by the Spanish Government. These mines, he said, have been operated for over 2,000 years by the Romans, the Phoenicians before the Romans, and undoubtedly the Tiberians before the Phoenicians. Views were presented of the tremendously extensive slag accumulations which covered large sections of the country and which date many years back.

Prof. Walker expressed his surprise at the extent of navigation on the Yangtse River in China and stated that there is a large smelting plant 50 miles down the river from Hankow, referred to as the "Chicago of China." He said that this city might also be called the "Pittsburgh of China," because of its engineering and steel plants.

Wood Shop Tool Grinder of Five Units

In the accompanying illustration is shown what is called the Plurality oilstone tool grinder, incorporating as a combination calculated well to meet the demands of wood-working shops a coarse oilstone wheel and a fine oilstone wheel, a grinding cone, a leather stropping wheel and an emery wheel. It is a product of the Mummert-Dixon Co., Hanover, Pa.

The two oilstone wheels, conspicuous in the picture, are kept saturated with kerosene directed from two oil reservoirs and controlled by faucets through tubes to the cup parts of the wheels. The oil is driven through the pores of the wheels by centrifugal force, thereby serving to keep the surfaces clean and free from glazing as well as affording a coolant for the tools.

The grinding cone for use in grinding gouges and

Combination Oilstone Tool Grinder for Woodworking Shops

irregular shaped tools may also be seen and is immediately in front of the leather stropping wheel for removing wire edges and putting the finishing touches to tools. At the far end of the machine is the emery wheel, with which is provided a rest passing along both the sides as well as the front of the wheel and designed to receive the so-called saw-gumming attachment.

The various units are set in a pan for catching oil and grit, and the pan is supported by a cored column with a broad floor base. Ball bearings are used. The driving motor is on the top of the machine. It has a direct connection with the emery wheel, while the oilstone arbor is driven by means of a train of gears enclosed in oil-tight cases.

Machine Combine Charged

Four manufacturers of machinery have been named as defendants in suits in equity brought by United States District Attorney Hough at Columbus, Ohio, charging violation of the Sherman anti-trust act. Those involved, the Sullivan Machinery Co., Goodman Mfg. Co. and Morgan-Gardner Electric Co., all of Chicago, and the Jeffrey Mfg. Co., Columbus, are alleged to have resorted to price fixing in securing a monopoly of the manufacture of mining machinery.

INDUSTRIAL PSYCHOLOGY

Further Progress Depends on Willingness of Industry to Cooperate with Psychologists

That industrial psychology is only in its infancy and that future progress in that field depends primarily upon industry's willingness to cooperate with psychologists by providing facilities for the controlled observation of the behavior of men, were emphasized in a paper on "Industrial Psychology—A Layman Asks Some Questions," by Dr. H. S. Person, managing director of the Taylor Society, presented at the meeting of that society held April 24 to 26. The meeting, which was reported in THE IRON AGE of May 1, was held at the Massachusetts Institute of Technology, Cambridge, Mass.

"Various addresses and articles on special aspects of psychology have led us laymen to assume perhaps," said Dr. Person, "that psychological research is able to offer positive achievements in the nature of principles and devices available for industry, greater than is warranted by the facts or is claimed by psychologists. It has led to the assumption, perhaps, that in this newly developing science is to be found at once the solution of many of the problems now perplexing industry."

As a result of a recent and reasonably extensive survey of the literature of psychology, the speaker said he was impressed, first, that the psychologists themselves are conservative and modest with respect to the positive achievements of their research, and especially with respect to the immediate practical value to industry of the results of that research. Second, that the exaggerated impression which "we laymen" have received of practical results, usable for purposes of prevision and control, has come from the utterances of amateur or dilettante psychologists whose enthusiasm has been more noteworthy than their information or their judgments.

There is a need for the cooperation of management in the further development of a science of psychology and in the development of a dependable technique of applied psychology, he stated, emphasizing that psychologists must be offered facilities for research in the field of industrial interests. Their researches have been restricted largely to laboratories, schools and psychopathic institutions, he said, and because of restricted facilities their study has been chiefly that of animals and children.

The pressing, practical problems of industry were said to be those pertaining to the behavior of adults, and if it is sought to incorporate verified laws of adult psychology into the science of management, it is the responsibility of industry to cooperate with psychologists in their research. The hope that psychologists will be able to give more attention to 'adult' psychology was expressed, it being emphasized that management is concerned much more with adults than with the young. Over-emphasis was said to have been given by psychologists to the part played by instincts, the part played by habits being under-emphasized.

Problems for Study by Psychologists

Phases of management the investigation of which by psychologists would be of particular service to industry were said to include the problem of training personnel. This problem, the training of executives, foremen and workers, was characterized as offering a challenge to thorough psychological investigation and as a more important and pressing problem than selection. "Personnel selected in accordance with conventional methods, essentially by chance, must be lifted," said Dr. Person, "by education and training to higher planes of specific performance and cooperation in general."

Monotony in industrial work was cited as another problem pressing for adequate psychological investigation. Monotony was to be distinguished from although related to, fatigue, the speaker said, saying also that he considered fatigue primarily a physiological problem. Understanding the nature and causes of monotony was emphasized as of importance to management, and he raised the question as to whether monotony results more from disposition than from the kind of work. "If monotony results from the disposition of the individual reacting, then," he said, "disposition must be classified and the managerial problem is one of selection and training for particular work in accordance with general intelligence and special aptitude and disposition."

The problem of incentives was cited as another for consideration by psychologists, and of greatest importance for management, it being said that very little was known about incentives in human beings. That the majority of individuals react most faithfully to such stimuli as assurance of continuous employment and continuous income, and payment in proportion to effort and accomplishment, was emphasized. Income in the form of money was said to be a powerful incentive, because by its nature the recipient is able to convert it at will into the widest variety of instinct-satisfying forms.

A field of investigation was presented by the intimate relation of the life of the individual outside office and shop to the individual inside office and shop, one's behavior inside the plant being influenced by outside conditions. "Home and church and club and neighborhood, wife and children and dependent parents, illness and pressing debts—such things in great number accompany men to their work, and play their part in determining their behavior in office and shop," the speaker pointed out.

Paper Discussed

The paper, only some of the oustanding parts of which are given above, included several pages of general impressions of the present state of the science of psychology. There was considerable discussion of the paper, which was generally commended. Prof. E. M. Chamberlain, Boston University, stated that, in general, the industrial manager is not fully cognizant of the field of psychology nor the limitations of it. Unwarranted assumptions are frequently made, he said, and statements of the unqualified often credited.

Johnson O'Connor, General Electric Co., Lynn, Mass., said that his company had started more than a year ago to study the problem of labor turnover. It was found that most of those who left had been employed only a short time. Sample jobs were created and applicants were tested to see if they would probably make good. A test devised for prospective assemblers, wherein 300 small brass pins were inserted in holes, the best time of an applicant in inserting the pins was found to be between 5 and 7 min. Almost all who did it within that time made good assemblers, he said. Other sample jobs, such as clerical and miniature instrument work, have been devised. It took about four months for the tests to show up in reduced turnover, but during the last seven months the labor turnover was said to be about one-half less than previously.

Daniel Starch, Harvard University, agreed that there is a need for study of industrial psychology and that industrial managers and psychologists should get together. Intelligence tests do not give a complete picture of the person and his qualities, he said. Four qualities that it was thought should be known were, a man's general ability; what he is interested in; how hard he will work at it, and something of the man's personality. The program of industrial psychology was said to include three problems: Problems of selection, of training, and problems pertaining to conditions of work.

Civil Service Examinations

Announcement is made by the Civil Service Commission, Washington, of examinations for a number of positions in the Government service. Full information and application blanks may be obtained from the commission in Washington or at the Post Office or Custom House in any city. The positions include junior physicists, junior technologists, laboratory assistants and junior aids.

Approximately 150 employees of Hamblin & Russell Mfg. Co., Worcester, Mass., wire goods makers, are on strike because of a reduction of 25 per cent in wages. Frank H. Hamblin, of the company, states a reduction in wages is necessary due to the keen competition in the market for wire goods business.

LA FOLLETTE IMPROVEMENTS

Pig Casting Machine at Blast Furnace—Employees' Club House

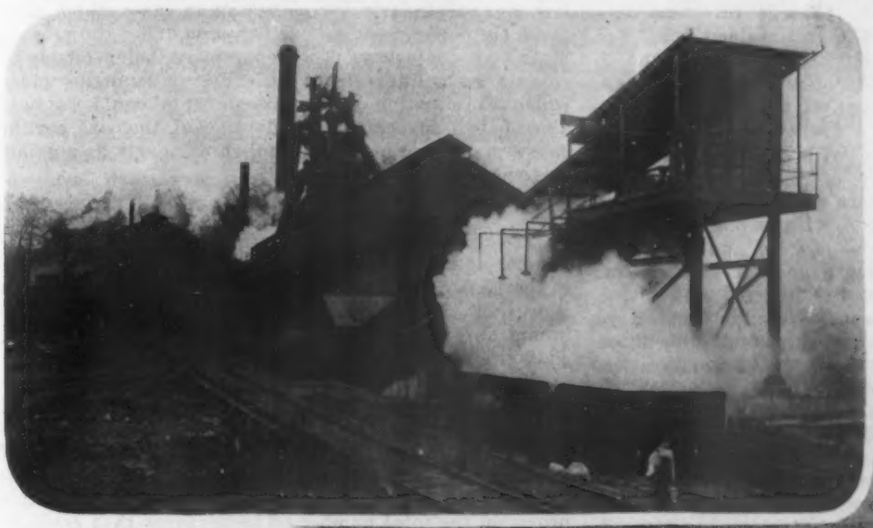
The LaFollette Coal & Iron Co., LaFollette, Tenn., has completed and placed in operation a single strand pig iron casting machine manufactured by the Pittsburgh Coal Washer Co. The foundations are arranged for a second strand if found necessary later. The machine is located at the end and outside of the cast house, as it was necessary to use the sand beds in the house during the period of construction.

The molten iron is transferred from the furnace to the casting machine, a distance of about 150 ft., in closed ladles patented by John D. Pugh, engineer, Mt. Washington, Baltimore, and manufactured by the M. H. Treadwell Co. As it is necessary to have a spare, two of the ladles have been provided. Each ladle has a capacity of 80 tons, and on the basis of four casts per 24 hr. one ladle will handle the present output of the furnace. With this type of ladle no overhead lifting or tilting device is required, as it is a long pour ladle, and an electric motor is placed on the truck for tilting. This motor is controlled by a man stationed in a small protected room on the opposite side of the casting machine from the ladle track, and close to the pouring spout, so that he can observe closely the rate of pouring, and therefore the size of pigs being cast.

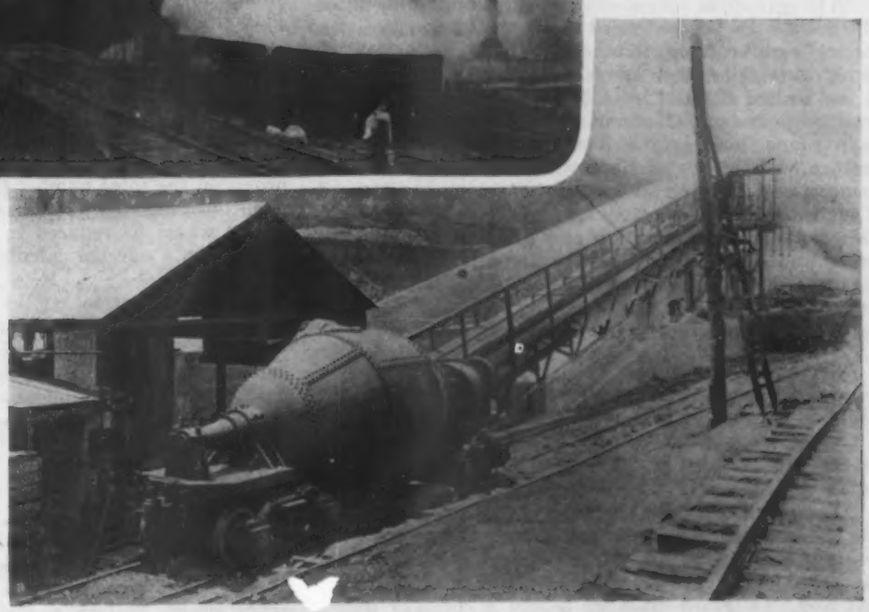
The LaFollette company's engineers made a study of different types of ladles before deciding to install the closed Pugh ladle. The question arose as to whether the closed type of ladle would skull up badly on foundry iron. So far this equipment has been in steady operation for four weeks at LaFollette, and no such trouble has been experienced. So far the ladle shows practically no skull whatever, and the production of scrap is nil, which is an important saving. The whole interior of the ladle remains red hot the entire time between casts.

Before deciding on the form of casting mold a study was also made of the size and shape of pig iron most satisfactory for foundries. Many foundrymen were consulted, and the consensus of opinion was in favor of a pig of about 100 lb. but one that would break in two easily if thrown on a block or struck a moderately hard blow with a sledge hammer, each piece weighing 50 lb. or slightly over. It was necessary too to keep in mind the importance of making a pig of such shape that the iron would pile easily. Also from the standpoint of the casting machine operator it was thought well to have a form of mold from which the iron would free itself and easily fall; in other words, a form that would not cause "stickers." Having all these points in mind the management specified a mold to be furnished with the machine that it is thought is giving the greatest all-round satisfaction.

The company is now casting its own molds from metal direct from the furnace. It is also proposed to cast its own wheels for the conveyor chain. The wheels and also the links furnished with the machine are of manganese steel. However, as LaFollette "special" foundry iron is high in manganese, of close grain, the management expects that this metal will make a durable conveyor wheel of long life.



(Left) Delivery End of the Strand, Showing the Blast Furnace in Middle Distance



(Right) Ladle Car in Operating Position at Pouring End of the Pig Casting Machine

In addition to the new casting machine, and also new concrete stock bunkers now under construction, the LaFollette company has under way additions and improvements in other departments, including the opening of a new coal mine, known as No. 5 Rex mine at LaFollette. When completed, the daily capacity of the coal mines will be 2500 tons.

The employees of the company, by their own subscription and the help of several of the company's directors, have just completed a large clubhouse, which they will open with appropriate ceremonies May 10. This building includes an auditorium with a seating capacity of 1000 people, kitchen, reading rooms, bowling alley, pool room, gymnasium, and lockers in connection with a nearby outdoor swimming pool. There is an organization of employees known as the "Coal and Iron Workers Benefit Club" which will be in charge.

New Immigration Policy of United States

Solicitor Risley Explains Operation of New Law and Expresses Hope That Highly Satisfactory Results Will Be Obtained

BY L. W. MOFFETT

WASHINGTON, April 29.—Reflecting a distinct departure in the immigration policy of the United States Government, the system of selection abroad before emigrants will be permitted to leave for this country has not been so clearly explained as seems necessary. The new legislation carrying this plan is of great importance to industry, and it is maintained that, restrictive though the new policy is, based on the 2 per cent-1890 census method, it will insure a high class of immigrants throughout, if the law is strictly followed.

No one is more familiar with immigration than Solicitor Theodore G. Risley of the Department of Labor. Because of his intimate grasp of the question, he was asked by THE IRON AGE to explain the new legislation, both as to the visa system and the readjusted quota plan and to give a general view of the subject of immigration as it has affected and under the reduced quota may be expected to affect industry.

"The principal cause of hardships and difficulties which have to be contended with in the immigration service results from conducting the examination of immigrants as to their admissibility after their arrival in the United States," said Mr. Risley. "Many immigrants dispose of all their belongings and sever all their connections in the home land before their departure, without any thought of exclusion and its consequences, and the privations and hardships experienced in such cases are frequently very grave and distressing. This method of examination also greatly increases the duties and difficulties of the immigration service and enhances the expense of administering the immigration laws.

Secretary Davis' Position

"Secretary Davis has thoughtfully and earnestly endeavored to secure the adoption of a method that would to a great extent avoid these serious difficulties of the service and hardships of the immigrant, not only for the improvement of the service but also for humanitarian reasons.

"The new legislation proposes the adoption of a system of visa certificates designed to put into effect a practical examination of the immigrant before his departure for the United States. This mode provides that any immigrant must go before a consular officer of the United States and make application for a visa certificate before his departure, which may be issued by such officer, and such application shall specify (1) his nationality, (2) his name, age, race, etc., (3) his occupation and (4) such additional information as the Secretary of State or Secretary of Labor shall prescribe as necessary to the proper enforcement of the immigration laws and naturalization laws. The validity of a visa certificate shall expire at the end of a period specified in the certificate, as shall be prescribed. No immigrant shall be required to secure any other visa of his passport by a consular officer before being permitted to enter the United States. The consular officer shall not issue such certificate if he knows, or has reason to believe, that the immigrant is not admissible to the United States under our immigration laws nor shall he be entitled to enter the country if the port of inspection shall find him to be inadmissible under the immigration laws. It is believed that this mode of examination of the immigrant will practically eliminate the coming of immigrants who are inadmissible because of any of the most usual causes of exclusion, such as imbeciles, feeble-minded persons, the insane, persons of constitutional psychopathic inferiority, alcoholics, paupers, persons afflicted with loathsome or dangerous contagious diseases, persons who have been convicted of crime, anarchists, and those who believe in or advocate the overthrow by force or violence of the Government of the United States or of all forms of law, and particularly the excess-quota cases which have given the department so much trouble under the present 3 per cent quota law. The department, being unable to effect a mutual agreement with foreign countries under which examination of the immigrants could be held abroad, has advocated the adoption of the visa certificate system in order to accomplish as nearly as possible this wise and humane policy."

Present Law and New Plan

The present 3 per cent quota law is based upon the number of nationals of such countries as were resident in the United States as determined by the United States census of 1910. Under this law the total number of immigrants that could be admitted annually from such countries as the law affects is 357,803.

It is now proposed that "the annual quota of any nationality shall be 2 per centum of the number of foreign-born individuals of such nationality resident in continental United States as shown by the census of 1890," but (in the Senate bill) that the minimum quota of any nationality affected shall be 100. Under this provision the total number of immigrants that could be admitted from the countries subject to such quota annually would be reduced to approximately 165,257, according to a careful calculation by the Department of Labor.

The immigration quotas allotted to specified areas under the present 3 per cent limit act and quotas that would be allotted under the proposed 2 per cent limit act (H. R. 7995), as shown by a close study by the department, are as follows:

Areas	Quota Under Present Act	Quota Under Proposed Act	Total Reduction	Per Cent Reduction
Northern and Western Europe	197,555	141,683	55,872	28.3
All others.....	160,248	23,574	136,674	85.3
Total	357,803	165,257	192,546	53.9

Solicitor Risley explained that the figures provided in the new legislation as it passed the House of Representatives include a quota of 100 in addition to the 2 per cent based on the census of 1890. The countries comprising northern and western Europe are Belgium, Denmark, France, Germany, Luxemburg, Netherlands, Norway, Sweden, Switzerland, Great Britain and Ireland.

Smuggling from Border Countries

It is the view of Secretary Davis that the principle of limitation of immigration, as provided by the quota law, should be extended to the Western Hemisphere in order to prevent the great influx of immigrants, particularly laborers from contiguous territory. This class of immigration has now assumed great proportions, it was stated. During the first six months of the present fiscal year there were regularly admitted from Mexico 41,769 and from British North America 103,616. There were thousands who entered illegally and a regular system of smuggling prevails along some of the United States borders because there are not enough men in the field service to patrol our borders effectually. There is no way legally to exclude aliens from such territories when they are able to pass the literacy and other legal tests as now provided by our immigration laws. They are coming in such great numbers as to constitute a

menace to American labor, in the opinion of Secretary Davis.

While both the House and Senate bills proposed a number of administrative changes and regulations, it was pointed out by the Solicitor that, with the exceptions of the visa certificate system and the 2 per cent quota basis, there is really no fundamental change in the basic immigration laws of the country.

To Remove Harsh Conditions

"The other main features are designed to relieve many of the harsh and perplexing conditions of our immigration laws and to simplify their administration as well as to protect more effectually the economic, industrial and social interests of our country," declared Mr. Risley. "Hospitable and benevolent as the United States has always been to the unfortunate, impoverished and oppressed of other countries of the world, the time has now come when sheer necessity requires us to adopt a systematically restrictive immigration policy in order that we may avert the pernicious conditions which inevitably follow overcrowded and heterogeneous populations that are not readily assimilable or easily blended into a homogeneous unit of people.

"We keenly appreciate how vastly our foreign-born residents and their children have contributed to the material development of our country and are proud to recall the names of thousands of them who have wrought and achieved, 'with stout hearts and efficient hands,' in the unparalleled progress of our country in all lines of human endeavor.

"But we ought not to depend upon a continuous influx of immigration to supply the necessary toilers for our enterprises. Instead we should endeavor to develop an industrial system that will ultimately overcome such needs and secure to us practical independence from the want of foreign laborers, such as is enjoyed by England, Germany, France and other great industrial countries.

"The present industrial organization of our country no longer demands such an importation of labor as was necessary for its rapid development. It is inconceivable that our social and economic enterprises will have to be abandoned or seriously impaired unless they continue to be sustained by a foreign labor supply and sooner or later the time must come when we will be compelled to develop such self-sufficiency as will render us entirely free from any such dependence upon other countries."

Shortcomings of Recent Immigrants

The immigrants that have been coming to the United States the last few years furnish but little of the brawn and strength that formerly were received, and which went into the mills and industries and on the farms of the country, said Mr. Risley. He made the interesting statement that approximately 75 per cent of these immigrants are now settling in cities, where many engage in trade and not a few in conducting restaurants, shoe-shining parlors, or vending articles on the streets.

Pointing out that there has recently been a great diminution in the immigration from the northern or Nordic countries of Europe, which heretofore have been such a great factor in the industrial and agricultural development of the country, Solicitor Risley said that these countries will now exhaust their annual quotas.

Dealing with the question of assimilation, Mr. Risley declared that the old immigrants were quick to become naturalized, to establish homes, particularly rural homes, and were tremendous factors in the agricultural development of the country. The racial identity of their descendants, it was asserted, soon disappeared. In contrast to this situation, Solicitor Risley said that the new immigrants are slow to naturalize and, because of their ethnic characteristics, do not readily assimilate. Reflective of this condition, Mr. Risley stated, is the fact that there are nearly 5,000,000 foreign-born who are unnaturalized. It was further stated that there are 1057 foreign-language newspapers published in the United States that are read daily by 10,000,000 people, and more than 100 languages and dialects are spoken by foreign-born residents.

Service of Foreign Press

The Solicitor, however, sounded a more cheerful note when he said that, as a result of the great Americanization movement that set in with the World War, many of the unfavorable conditions are rapidly being overcome and that the foreign-language press in this country has done a great and helpful work in this respect. He said that it carries five times as much American news as it did before the war.

The most decisive results in immigration, Mr. Risley said, have been in the industrial field. In two generations, he declared, it has transformed the United States from an agricultural to the greatest industrial country in the world. In a period of 10 years, the Solicitor said, 6,000,000 immigrants and their children found employment in industries of the country.

It was pointed out that a report of the Immigration Commissioner shows that in the iron and steel industries immigrants have contributed 70 per cent of the labor and other large proportions were cited in other fields.

Increased Iron and Steel Production in Canada in March

The production of pig iron in Canada during March amounted to 77,290 long tons, or an increase of 17,002 tons over that of February. The increased output was made up entirely of basic iron for the further use of companies reporting, while foundry and malleable iron showed a falling off in production on account of the blowing out of a furnace at Hamilton, Ont. The cumulative production of pig iron for the first three months of this year amounted to 201,280 gross tons, divided by classes as follows: Basic, 129,723 tons; foundry, 61,709 tons; malleable, 9848 tons. The average monthly output for the three months was 67,000 tons as compared with 50,000 tons for the same period in 1923, 36,000 tons in 1922, and 53,000 for 1921, for the monthly average.

During March one additional furnace was blown in by the Algoma Steel Corporation, Saulte Ste. Marie, Ont., for the production of basic iron; and the Steel Co. of Canada, Hamilton, Ont., blew out one furnace for the purpose of re-lining. At the end of the month, active furnaces were one at Hamilton, three at Sault Ste Marie, Ont., and three at Sydney, N. S.

The output of steel ingots and castings in Canada during March was 94,962 tons, an increase of 24,009 tons, or 34 per cent over that of February. The average monthly production for the first three months of this year was 69,000 tons, compared with 61,000 tons for 1923, 35,000 tons in 1922, and 51,000 tons in 1921.

Pacific Coast Wire Rope Plant

To serve the demand for wire rope and steel cables made by modern methods of logging in the Pacific Northwest, the Wire Rope Mfg. & Equipment Co., Seattle, Wash., has for some time had in operation a plant in Seattle with a capacity of about 9 tons of steel cable daily or some 200 tons per month. The market covers primarily the Pacific Coast States and Alaska, though shipments as far away as the Philippines have been made. The plant turns out wire rope from the size of a clothes line to that used for cable street railroad lines. The largest size which this plant can turn out is 3 in. in diameter.

Wire for making into rope is purchased largely in Europe, varying from 0.026 in. to 0.150 in. in diameter. It is made of acid steel from a compound of British hematite and Swedish iron. This wire is spooled, then stranded and finally closed, when the strands of smaller rope are twisted into the larger rope or cables.

Edward I. Garrett is president, George B. Gemmill, vice-president, Evan Gough, secretary and plant manager, as well as engineering expert, and Russell Gough is plant superintendent.

Wages and Hours in Manufacturing*

Analysis of the Iron and Steel and the Foundry and Machine Shop Groups from July, 1914, to January, 1924

INVESTIGATION of 1678 manufacturing plants in many lines of industry covered 697,965 wage earners at the peak month, June, 1920. Thus approximately 16 per cent of the total number of wage earners reported in the 1919 Census of Manufactures for the 23 industries studied are covered.

No attempt was made to study wages during the war period, and after July, 1914, the next period covered is June, 1920. From that date through January, 1924, a complete monthly record is available, with the exception of the first half of 1922, which was not covered by an investigation. Executives, office and sales forces, foremen and assistants, clerical workers and others paid on a salary basis are excluded.

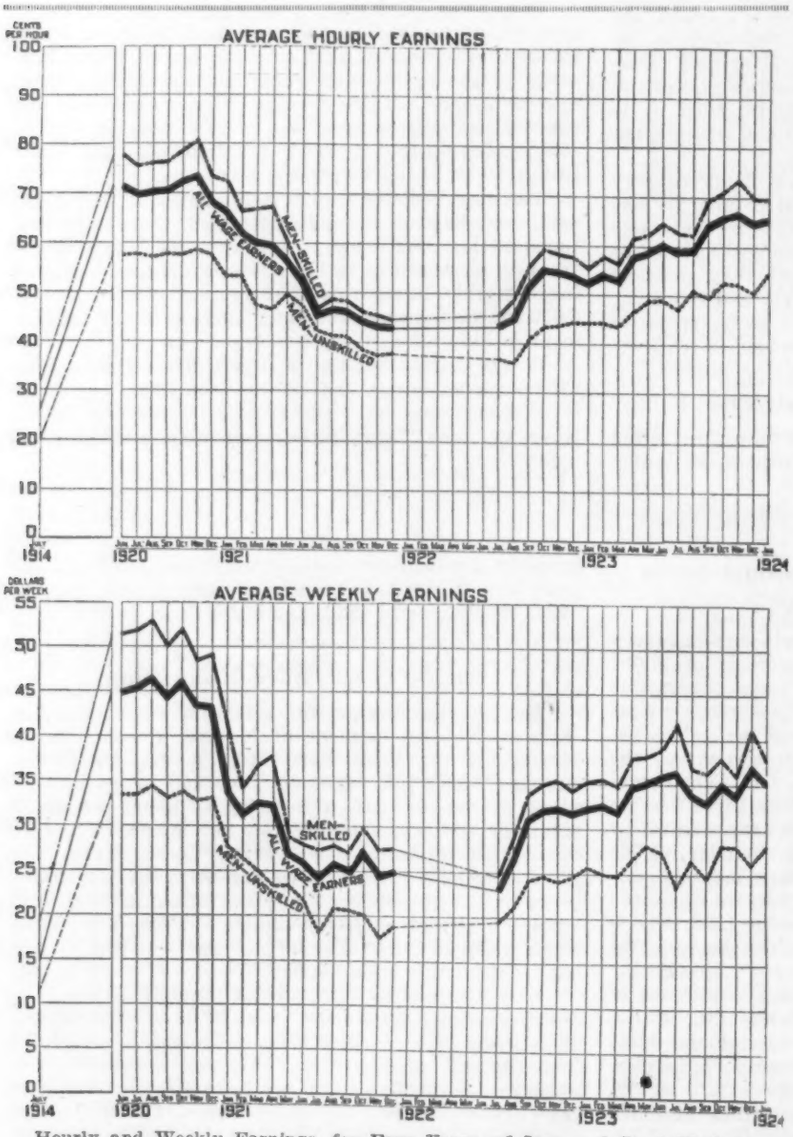
Iron and Steel Manufacturing

Wage data for the iron and steel industry cover blast furnaces and rolling mills engaged in the manufacture of pig iron, wrought iron and rolled steel products. Varying hours of work, irregular shifts, the mixture of piece, day and tonnage work, make the compilation of wage data showing actual hours or hourly earnings in iron and steel plants exceedingly difficult. The inclusion, in some cases, of all the non-tonnage workers under the "unskilled" classification has the effect of raising the earnings of this labor group somewhat above the true level for strictly "unskilled" labor. These facts should be borne in mind when studying the hourly data for this industry.

Many establishments in the iron and steel industry underwent a considerable change during the second half of 1923 in the adjustment of working hours of a large group of labor from a 12-hr. to an 8-hr.-a-day basis. This fact, combined with the wage rate increases granted during the year, probably accounts for the considerable increase in earnings during 1923.

Average hourly earnings of all wage earners were 65.3c. in January, 1924, an advance of 24.3 per cent since January, 1923. Hourly earnings of unskilled labor show a gain of 23 per cent and skilled labor of 24.9 per cent. Average weekly earnings of all wage earners stood at $35.02 in January, 1924, 8.9 per cent higher than in January, 1923, and 134 per cent above the level of July, 1914. Weekly earnings of unskilled labor show a gain of 9.7 per cent over the previous January and skilled labor a gain of 7.5 per cent.

*From Research Report No. 69 of the National Industrial Conference Board, New York.



Hourly and Weekly Earnings, for Four Years, of Iron and Steel Workers, Compared with Their Earnings in 1914

Foundry and Machine-Shop Products†

Foundries and machine shops are necessarily employed in manufacturing a great variety of products and, while there are establishments making well-defind products that might be placed in a separate group, many other shops manufacture miscellaneous products in such wide variety that separation into small classifications has not been attempted. The foundry and machine-shop division covers all establishments not included under the other classifications in the metal manufacturing group.

Returns were received from 614 establishments widely distributed through the manufacturing sections of the country. The largest number of wage earners employed in these plants in any one month was 206,106 in August, 1920. Thus, approximately 18 per cent of the wage earners reported by the 1919 Census of Manufactures as employed in foundries and machine shops are covered.

Average hourly earnings of all wage earners were 58.8c. in January, 1924, an advance of 11.6 per cent since January, 1923. Hourly earnings of unskilled male labor show a gain of 11.9 per cent, of

†Exclusive of agricultural implement, automobile and electrical apparatus manufacturing.

Payroll Data—Iron and Steel Manufacturing

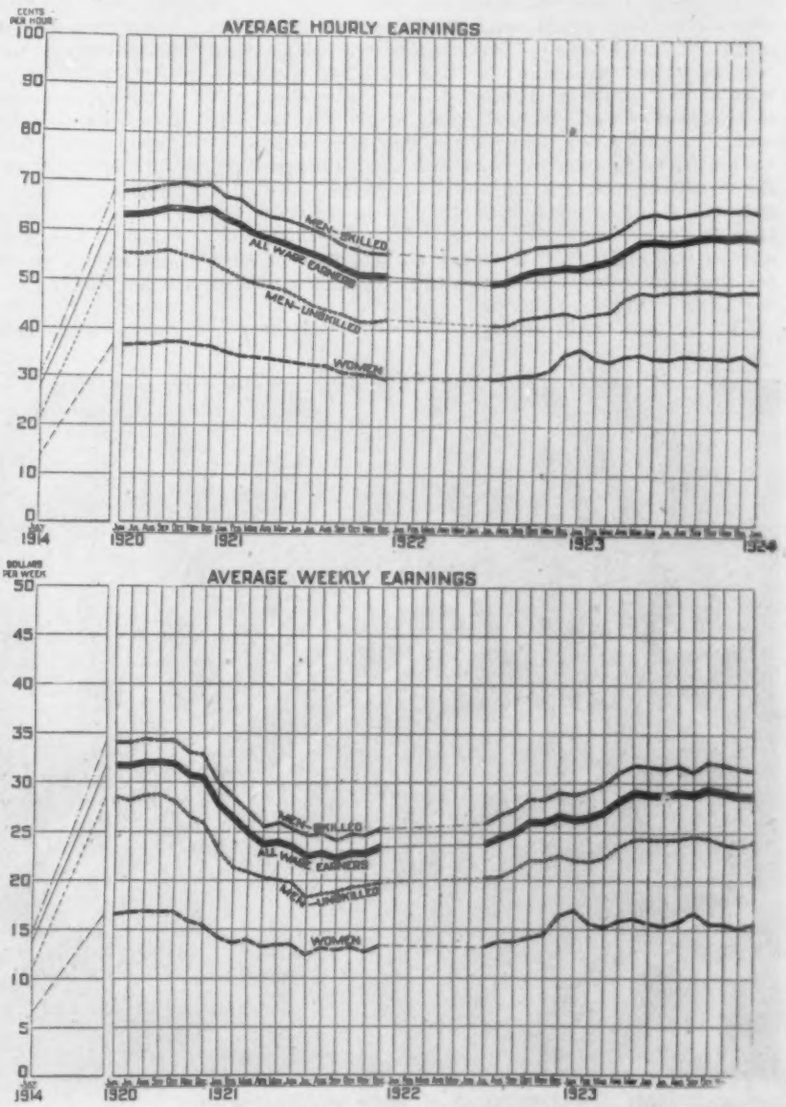
One Week In	All Wage Earners: Number Wage Earners (Index)	All Wage Earners: Average Week per Wage Earner Hr.	All Wage Earners: Average Earnings Hourly	All Wage Earners: Average Earnings Weekly	Male—Unskilled: Average Earnings Hourly	Male—Unskilled: Average Earnings Weekly	Male—Skilled: Average Earnings Hourly	Male—Skilled: Average Earnings Weekly
July, 1914	...	57.0	26.3c.	$14.96	20.6c.	$11.20	32.1c.	$19.20
June, 1920	100.0	63.2	71.1	44.98	57.6	33.45	77.7	51.23
Dec.	96.0	63.5	68.2	43.34	57.8	33.19	73.4	49.17
March, 1921	70.9	54.0	60.0	32.46	47.5	25.03	66.9	36.66
Aug.	40.4	55.1	46.6	25.63	41.6	20.91	48.7	27.92
Dec.	49.9	58.0	42.9	24.89	37.7	18.92	44.9	27.67
July, 1922	70.5	53.6	43.2	23.16	36.9	19.57	45.8	24.68
Oct.	72.2	58.5	54.6	31.89	43.3	24.68	59.0	34.84
Jan., 1923	78.2	61.3	52.5	32.15	44.4	25.65	55.5	35.13
Apr.	78.2	60.2	57.6	34.66	46.9	26.63	61.5	37.89
July	77.9	61.9	58.9	36.39	47.0	23.58	62.6	41.98
Oct.	75.4	53.3	65.8	35.02	52.4	28.22	71.1	37.70
Jan., 1924	73.5	53.6	65.3	35.02	54.6	28.15	69.3	37.76

skilled male labor a gain of 10.9 per cent and of women a drop of 8.9 per cent. In January, 1923, women were earning higher weekly wages ($17.05) than at any other time covered by the survey. Their hourly earnings at that time were second only to those of 1920.

Average weekly earnings of all wage earners stood at $28.65 in January, 1924, 8.6 per cent higher than in January, 1923, and 111 per cent above the level of July, 1914. Weekly earnings of unskilled male labor show a gain of 8.2 per cent over the previous January, of skilled male labor a gain of 8.3 per cent and of women a drop of 8.9 per cent.

"Erection of Steel Bridges" was the subject of a paper presented by N. H. Orr, assistant engineer, American Bridge Co., Pittsburgh, at the bi-monthly meeting of the civil section, Engineers Society of Western Pennsylvania, at the William Penn Hotel, Pittsburgh, Tuesday evening, May 6.

Developed water power plants of the United States now number 3200 of 100 hp. or more, according to the Geological Survey, Department of the Interior, and have a total capacity of installed water wheels of 9,086,958 hp., an increase of about 1,160,000 hp., or nearly 15 per cent, over the 7,926,958 hp. of 1921. Of the present total, 81 per cent is in public utility plants and 19 per cent in manufacturing plants. The corresponding percentages in 1921 were 78 for public utility plants and 22 for manufacturing plants. New York is the leading State, followed closely by California.



Hourly and Weekly Earnings, for Four Years, of Foundry and Machine Shop Workers, Compared with Their Earnings in 1914

Payroll Data—Foundry and Machine-Shop Products

One Week In	All Wage Earners: Number Wage Earners (Index)	All Wage Earners: Average Week per Wage Earner Hr.	All Wage Earners: Average Earnings Hourly	All Wage Earners: Average Earnings Weekly	Male—Unskilled: Average Earnings Hourly	Male—Unskilled: Average Earnings Weekly	Male—Skilled: Average Earnings Hourly	Male—Skilled: Average Earnings Weekly	Women: Average Earnings Hourly	Women: Average Earnings Weekly
July, 1914	...	49.0	27.8c.	$13.61	21.4c.	$10.89	30.7c.	$14.85	13.8c.	$6.60
June, 1920	100.0	50.2	63.2	31.70	55.5	28.53	68.0	34.10	36.5	16.54
Dec.	86.2	47.1	64.5	30.40	53.8	25.85	69.6	32.81	36.4	15.40
March, 1921	67.5	41.9	59.5	24.96	49.6	20.75	64.3	27.04	34.3	13.92
Aug.	49.7	42.1	54.1	22.77	43.9	18.63	59.1	24.89	32.3	13.17
Dec.	55.1	46.0	50.9	23.40	42.2	19.76	55.6	25.47	29.9	13.37
July, 1922	72.1	48.0	49.5	23.75	41.0	20.27	54.3	25.93	29.9	13.14
Oct.	79.4	49.9	52.0	25.97	42.9	22.04	57.0	28.37	30.8	14.19
Jan., 1923	87.8	50.1	52.7	26.38	43.0	22.11	57.9	28.83	36.1	17.05
Apr.	91.7	50.4	56.1	28.29	46.6	23.69	61.3	31.01	34.7	16.06
July	91.9	49.4	58.1	28.73	48.0	24.23	63.6	31.43	34.0	15.39
Oct.	90.6	49.2	59.6	29.31	48.3	24.34	65.3	32.06	34.4	15.53
Jan., 1924	81.3	48.7	58.8	28.65	48.1	23.93	64.2	31.22	32.9	15.54

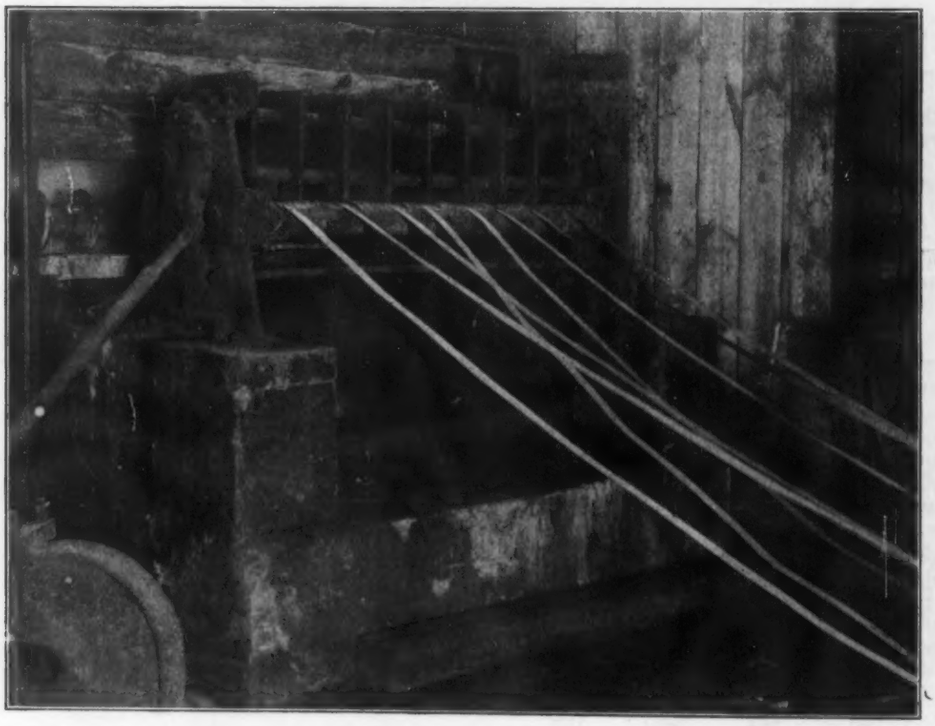
Continuous Cleaning of Strip Steel

Sixteen-Block Unit of Trumbull Steel Co. Has Capacity of 50 Tons Per Day—Quality of Product Improved

A CONTINUOUS cleaning machine for removing the scale from hot-rolled strip steel before cold rolling has recently been installed in the plant of the Trumbull Steel Co., Warren, Ohio. The strip is drawn through a row of large pickling vats by means of a take-up frame which rewinds it on blocks in its original compact coil form. The coils then go to the cold rolling department. There is a row of five cleaning vats in series, each being 24 ft. 6 in. long, 6 ft. 5 in. wide and 12 in. deep. These vats are made of cypress and contain diluted sulphuric acid. Following the acid tanks is a cold water vat 6 ft. 6 in. long and a hot water vat 16 ft. 6 in. long, in which the acid is cleaned off. After leaving the last vat the strip passes through a gas-heated drying chamber and on to the drums of the take-up frame, upon which it is coiled. Auxiliary lime and oil tanks (16 ft. 6 in. and 6 ft. long respectively) are provided so that, if desired, the strip can be coated with lime or oil for shipping.

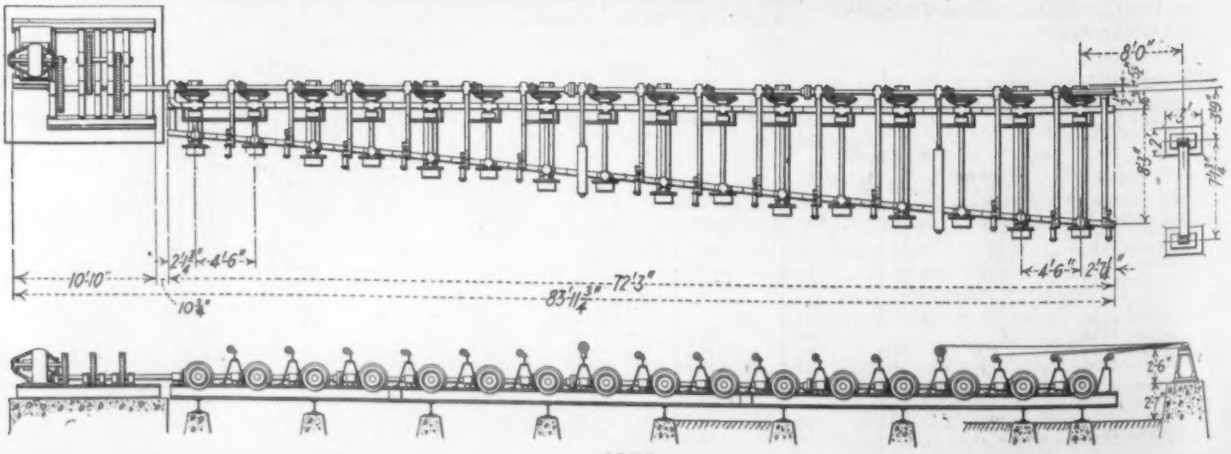
As the take-up frame is provided with sixteen collapsible blocks located on 4 ft. 6 in. centers, sixteen strips 4 in. wide or eight strips 8 in. wide can be run through the machine at the same time. As the maximum number of blocks is provided for use in rolling the narrow strip, fewer than sixteen blocks, depending upon the width of material, are used when cleaning strip wider than 4 in. The take-up frame is driven by a 50-hp. variable speed motor with a speed range of 500 to 1500 r.p.m. This permits the frame to be driven at different speeds, depending upon the gage of the steel. The coils of strip are brought from the hot mills on a ram type electric truck, which is used also for taking the material to the cold rolling department after cleaning.

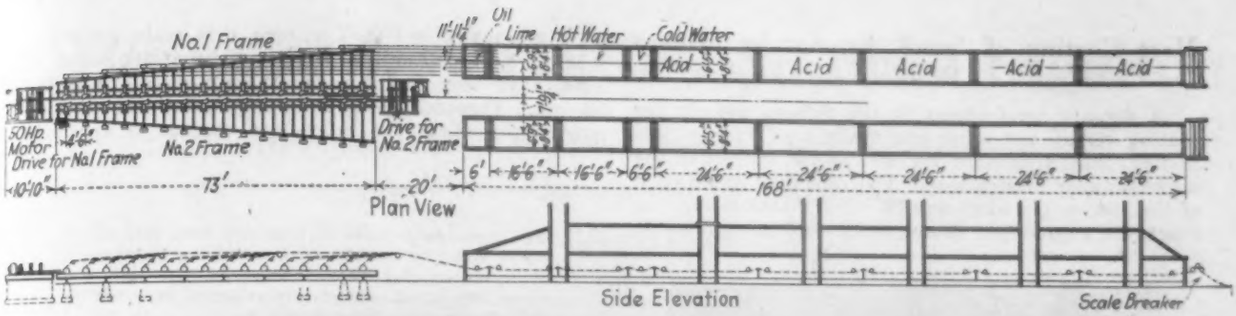
The coils are placed on turnstiles in front of the machine and pass through a scale breaker and adjustable guides before being drawn into the first acid tank. When the end of a coil is reached another coil is spot welded to it. This welded section is sheared off when the end of the coil is reached on the block on the take-up



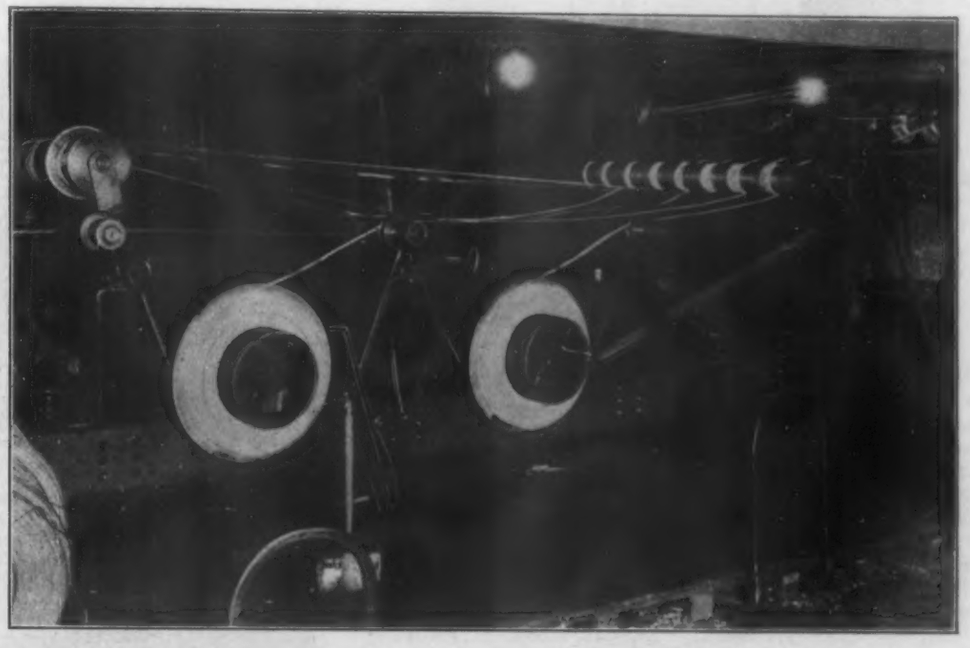
Eight Strands of Narrow Strip Steel Being Fed Into the First Acid Tank. The steel passes first through a "scale breaker," shown in the illustration and consisting of three pyramided rolls through which the material is pulled, the sharp changes in its direction, with resultant bends, serving to open up the scale on its surface

Below Is a Detail View of the Take-Up Frame, With Its 16 Collapsible Blocks on 4½-Ft. Centers





Above Is the Lay-out of Cleaning Baths and Take-Up Frames. Only the No. 2 group has been installed as yet. The succession of acid, water, lime and oil vats may be noted, through which the material passes from right to left in its progress to the take-up frames



At Right Are the Two First Blocks of the Take-Up Frame, Showing How the Cleaned Steel Comes from the Baths

frame. Granite rolls are used for holding the strip in the acid.

Although the cleaning outfit is designed for construction in two adjoining parallel units, as shown in the plan view, only one unit has as yet been installed. The company is using it successfully for cleaning strip up to No. 12 gage and for material up to 7 in. wide. Strip of about the same gage is run through at a time, as the speed normally is decreased with an increase in the gage. For example, No. 15 and No. 16 gage material is run through at the same time. The average speed at which the material moves through the tanks is 12 to 15 per minute. The capacity of the unit is 50 tons every 24 hr.

Common practice of removing this scale from hot strip steel is to handle it in and out of pickling and washing tanks in cradles by means of cranes or hoists. When this method is followed, the coils first have to be opened up so that the solution may come in contact with the inner surfaces. When cleaning this way the coils are left in the acid 15 to 20 min. and about the same length of time in the water.

Advantages claimed for the continuous cleaning system, as compared with the system of dipping the strip in the vats, include better cleaning, entire elimination of scale spots, better quality of cold rolled product because there are no scale spots rolled in the steel, and less acid is required. The cleaning cost is lower, the efficiency of the cold mills is increased because the coils come to the mills in better shape, and better finish can be put on the cold strip, due to uniform cleaning.

This continuous cleaning apparatus was designed by the Broden & Dailey Construction Co., Cleveland, working in cooperation with the engineering department of the Trumbull Steel Co. and was built and installed by the former company.

Electric Arc Used in Repairing Locomotive Guides

A new process for repairing locomotive guides was displayed at the National Railway Appliance Association exhibition at the Coliseum, Chicago. By means of it the General Electric Co. claims to have eliminated all difficulties previously encountered in renewing these guides and keeping them up to standard.

The process used was electric arc welding automatically applied. The guides were placed in an ordinary lathe and on the tool post was mounted the automatic welder. When in operation, the guide remained stationary and the automatic welder traveled along with the carriage of the lathe, depositing electrode metal on the worn surface of the guide. The welding was applied on the side surface of the guide covering a width of 2 in., beginning the welding on the inside and laying down adjacent beads working to the outer edge. Two layers of beads were required to build up the worn spot, a total of ⅜ in. on each side. This was then machined away ⅛ in. on each side, leaving ¼ in. finished built-up stock. The length of the built-up guide was 5 ft. A total of 3 hr. was required for welding both sides, using 150 amperes, 20 volts across the arc and ⅛-in. diameter electrode wire.

Figures obtained from a railroad now using this process indicate the following tabulations of cost data:

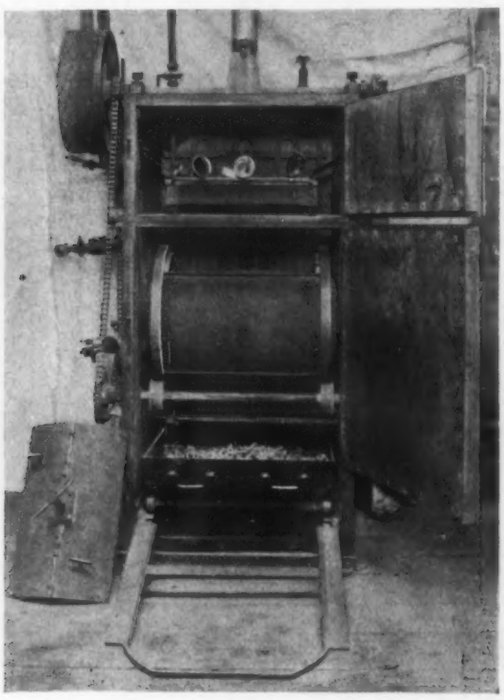
Four Guides Reclaimed by Automatic Electric Arc Process

Labor (12 hr. at 78c.)	$9.36
Electric power	2.40
Electrode (28 lb. Roebling)	2.53
Total (four guides)	$14.29
Cost (one guide)	3.57

The Rhode Island Malleable Iron Works at Hillsgrove, R. I., is having plans prepared by Frank D. Chase, Inc., engineer and architect, Chicago, for a new foundry building, additions to power plant and other improvements.

Mass Coating of Small Articles by Schoop Process

A notable development of the Schoop process for coating metal and other materials with such metals as zinc, lead, aluminum, tin, etc., is the subject of the accompanying illustrations. They show an application of the process for what may be called mass coating. In short, the reproduced photographs show a machine to



Articles to Be Metal Coated Are Heated in the Tray at the Top. The coating is done in the rumbling barrel below. The tray in the bottom receives the completed product

meet a demand for treating small parts in bulk. It is marketed by Metals Coating Co. of America, 495 North Third Street, Philadelphia.

It will be unnecessary to detail the Schoop process itself, as this has been discussed in these columns in the various stages in its development. In its best-known form it employs a form of pistol to which the Philadelphia company has applied the name of Metalayer. This Metalayer, weighing 3½ lb. and for normal applications controlled in the operator's hand, is connected to standard acetylene and oxygen cylinders and to a supply of compressed air. Metal in the form of wire is automatically pulled from a reel in the rear of the gear case and fed uniformly to the muzzle of the short barrel where it enters a reducing flame developed from the gases and air and is there melted and blown at a velocity of about 3000 ft. a sec. in a very fine spray and deposited on the surface being coated. The coating may be applied naturally after fabrication as well as before and may be done for the purpose of decoration or for protection from corrosion or chemical action or for repairing defects, as in a casting.

The accompanying photograph of the machine with the doors open shows preheated coils at the top, a rumbling barrel underneath and upper and lower trays. Articles in the upper tray, after heating, are emptied into the revolving drum and then after coating are passed to the lower tray, which is carried on wheels running on rails.

The second picture shows the machine ready for action; the Metalayer is shown attached to a reciprocating mechanism (there is also another Metalayer on the opposite side) and near the bottom are bunsen burners connected with an illuminating gas supply for maintaining the interior temperature to the required degree.

The machine is 4 ft. 4 in. long, 6 ft. wide and 6 ft. 6 in. high. Small articles, in quantities of 100 lb. at a time, have been coated with different metals in 8 to 30 min. Threaded parts, it is emphasized, do not require rethreading, the interior of fittings is reached

For Covering Articles in Quantity with Zinc or Other Metal by the Schoop Process, the Machine Here Shown Has Been Developed. The Metalayer, so called, throw a high-speed spraying jet, one on each side of the machine, into the interior of the revolving barrel

by the coating and if desired the parts may be ball polished or rumbled in leather scrap or sawdust for finishing before removal.

Cement Company Formed in California

The American Portland Cement Co., a $3,000,000 corporation, recently was organized to operate a cement property in Imperial County, Cal., near Coyote Wells. Within a few months work will be started on the first of a two-unit plant, each unit having a capacity of 1000 bbl. per day. In the region chosen there occur large deposits of shell lime, together with fine maudlin clay. The material is available by steam scoop shovels. Deposits of the constituents of white cement also are available on the properties acquired, according to W. L. Peck, president of the company.

A group of Los Angeles business men are financing the enterprise. H. T. Lucas is vice-president; C. E. Merryweather, secretary, and S. G. Ulmer, treasurer. Headquarters are at 921-22 Commercial Exchange Building, Los Angeles.

The Twenty-Year Service club of the Albany Hardware & Iron Co., Albany, N. Y., last week held its annual meeting and banquet. Nineteen members compose this club and all have been in the firm's service for 20 years or more. The officers are William I. Baker, president; W. B. Wackerhagen, vice president; James K. Dunscomb, treasurer and William E. Foskett, secretary.

Design of Welds—Flexibility Vs. Rigidity

Attempts to Force Bending Strains Outside the Area of the Weld—Comparisons with Riveting —Fit the Weld to the Case

THERE is a wide difference of opinion among experts as to whether a weld in a structure should be designed more rigid or more flexible than the parts which it joins. This subject was accordingly selected as the topic for discussion at the annual meeting of the American Welding Society, reported in THE IRON AGE last week. Recognized experts in each of the welding fields have prepared short papers outlining their views. Extracts from these papers, as outlined in the report of the meeting, published last week, are given here.

Carbon Arc Welding*

WHEN a weld is made by the carbon arc process, the heating of the metal is very rapid; as the arc progresses along the joint, the metal that is melted is raised from room temperature to at least the melting point of steel in a fraction of a second. At this elevated temperature, the metal is propelled from the side of the crater that the arc is approaching to the side it is leaving. This force transfers from one side of the crater to the other 15 or 20 lb. of steel per hr., when an arc of about 300 amperes is used under proper conditions.

The action of the metal in a carbon arc, as well as the action of the metal in the metallic arc, can be explained on the assumption that steel at freezing temperatures or at the melting point dissolves large quantities of gas and that the capacity of steel to retain gases in solution decreases rapidly as the temperature of the steel is increased. The metal in both the carbon and metallic arc acts as if gas were evolved in or behind the heated metal and this acts as a blast to propel the metal from the hot side of the crater to the cool side, and from the metallic electrode to the work, even when the work is above the electrode, as in vertical welding. The rate at which the metal cools is much lower than the rate at which the temperature is raised, but even then the temperature of the metal falls with the same order of rapidity that the temperature of metal falls when it is quenched in water.

In tensile strength, the steel after it has passed across the crater is almost equal to the original steel. Unfortunately, the ductility of the weld metal is not so great as the ductility of a good, ordinary cast steel. Improvement in the art of electric arc welding must be made in the direction of increasing the ductility of the weld metal. Another indication that weld metal is not ordinary cast steel is the fact that it will not stand up under prolonged heating, at a bright red heat or above, nearly so well as the ordinary steel casting.

In the present state of the art we cannot expect metal of the highest ductility in the weld metal and it is not to be expected that this metal will stand repeated bending so well as metal of a different structure and, therefore, the welds must be made so as to throw any bending strains outside the weld. In other words, the weld must be made rigid.

*By J. C. Lincoln, vice-president Lincoln Electric Co.

Strains in the Plates

It seems to be a safe statement that the locked-up strains in a weld are more largely due to the heating and cooling of the plates than to the cooling of the weld metal. The best study of locked-up strains in welds can best be made by studying welds in cast iron. The volume of melted steel is about 7 per cent greater than the volume of the same metal cold. There is, therefore, about the same shrinkage in the weld metal when welding cast iron as when welding steel. The tensile strength of cast iron is about one-third that of steel. Therefore, a given strain in cast iron is three times as likely to produce a crack in the iron as in the steel. The greater ductility of the steel as compared with cast iron greatly increases this ratio.

Experience in cast iron welding shows that heating of the edges of the plates to be welded must be reduced to the minimum, to prevent cracking due to cooling strains. It is impossible to prevent the cooling strain due to the cooling of the melted weld metal, but experience shows that it is possible to do very difficult cast iron welding if care enough is taken to avoid excessive heating of the edges of the plates to be joined. This is done by welding ½ in. or more and then letting the weld and plates cool before doing any more welding. The shrinkage of the weld metal is the same, whether the cast iron is welded continuously or in short steps, waiting for the metal to cool between steps. Local heating of the cast iron is less in the step by step method and the fact that this method produces a weld in cast iron less liable to crack indicates that the heating of the metal adjacent to the weld is, in this case, the determining factor between a good and a bad weld.

Gas Welding*

IT seems obvious that the ideal weld is one which has exactly the same physical properties as has the piece in which it is made. But we know from experience that it is unusual to get this result. A weld is a casting, and the same properties cannot be obtained in a casting as in a forging. The cooling rate of a casting made in a sand mold is different from that of a weld made in that casting, and this alone creates different properties. Differences in chemical composition between base and added metals is another fruitful source of difference in properties.

Everything considered, I know of no instance in which it is possible to obtain in a weld the same physical properties as in the base metal. In cast iron the weld is always stronger than the base metal. In soft steel the ductility is always less, and the strength usually lower. In brass and bronze the conditions vary greatly as to the strength and ductility of the base metal, so that it is not possible to generalize as to the relative physical properties of base metals and welds.

We can, however, go so far as to say that, as a usual thing, a weld in wrought metal has less elongation and reduction of area than the base metal, largely because it is a casting. In cast metals the properties of the weld are usually more nearly those of the base metal, though never exactly the same.

*By S. W. Miller, research engineer Union Carbide & Carbon Research Laboratories, New York.

Locate Break Outside the Weld

In any kind of joint it is desirable to have an efficiency of 100 per cent and it seems to me that since we cannot expect the same properties in the weld as in the base metal, the practical question is, what can be done to arrange matters so as always to avoid breaking

in the weld in service, in cases in which breakage would be serious, and, if this cannot be done, how far can we go toward accomplishing it? As an illustration, a weld made in soft steel plate with ordinary low carbon wire, a very common combination, has usually less tensile strength than has the plate. We can increase the total strength of the weld by increasing its sectional area or, as we say, by reinforcing it. This is especially true if the weld be of the double V type. But if the plate be of, say, 60,000 lb. tensile strength, it is not sure that this increase will make the weld stronger than the plate. Also the strong plate puts stresses into the weld, which may be dangerous in service.

We can help matters much if we insist on using plate of less tensile strength, which is more ductile, so that the weld will be stronger than the plate, and, therefore, the stress distributed over the plate and not concentrated in the weld. Evidently the same result can be obtained by using suitable high-tensile strength welding material with the high-tensile strength plate. But here the effect of the heat must be more carefully considered, as a very high-carbon plate may be so damaged by the welding as to make it weak and brittle.

Again, it is becoming common to weld cast iron with bronze, and many jobs can be done this way that can be done only with difficulty, if at all, when using cast iron welding rods. The bronze weld does not have the same physical properties as the cast iron. Its tensile strength is much higher, its ductility is greater and it has a very low elastic limit. The last property makes it unsuitable for any part that must not give under stress, such as a stamping press frame.

Metal Arc Welding*

SHALL a weld be made to absorb all the stresses of warpage and bending, or shall it be deliberately made to pass these on to the rolled or forged parent metal?

Let it be remembered that an electric arc weld is a casting and, fortunately, a very good casting. By means of improved methods the weld may even be refined to the point of exhibiting the physical and chemical characteristics of the best grade of electric steel castings. Nevertheless, except in some special cases, it seems obvious that the weld deposit should not attempt to compete in strength with the rolled plate. This plate, originally a casting, has been worked and rolled to a point where it has taken on properties which a plain casting cannot possess.

In spite of this, the process of arc welding affords a superior means of joining rolled plates or structural forms. In welding steel or iron castings, the principal result desired is the production of a stiff, solid joint, and the weld should possess those properties of elongation and ductility found in a good casting. Under these conditions all parts of the weld should be capable of withstanding the contracting strains of the base metal. Although, in arc welding, these strains are usually small, they may sometimes be sufficient to produce a faulty weld, especially when the weld is made "cold."

However, if the weld cools without cracking, there need be no apprehension as to the presence of locked-up strains therein. As a matter of fact, the act of stretching steel beyond its elastic limit (although not beyond its ultimate strength) actually results in an improvement in its physical properties of ductility and elongation. If this is so, then the stretching of a steel weld beyond its elastic limit produces beneficial effects in the weld itself, so that, no matter how much the weld is strained, if it cools without breaking it may be relied upon. Most welds that crack do so during welding, or directly after, while the piece is cooling. The reason for this is usually that a cross-section of sufficient strength to withstand the strains of cooling has not been provided.

This brings us directly to the point to be emphasized, that all electric arc welds should contain an adequate cross section and adequate stiffness to be able to transfer all the strains which occur after cooling to the parent metal, which, supposedly, is better able to withstand these strains.

Although stretched steel is improved by moderate working, continued or intermittent stresses applied beyond the elastic limit will cause fatigue and complete loss of strength. Because of the fatigue tendencies of arc-welded steel, which are usually greater than those of worked metal, no live loads exceeding the elastic limit of the weld should be applied to it.

No riveted joint is designed to bend, and even the strongest of these joints—the double-butt strap—is certainly not capable of absorbing any of the bending strains within itself. This type of riveted construction is considered satisfactory for every use to which riveting is put; it would seem, then, that the same type of rigid construction would be entirely feasible in a weld. If this is so, the costly and unproductive research for a rubber-like welding material is scarcely justified.

In operations upon cast iron the steel arc weld is a better joining medium than the base metal; hence a weld of this type may be made to possess the capacity of absorbing all the cooling strains, and thereafter to hold the casting in its previous rigid state through a link stronger than the original metal. In cast steel welding all the physical properties of the parent metal are easily duplicated and a practically homogeneous result assured.

*By C. J. Holslag, chief engineer Electric Arc Cutting & Welding Co.

Resistance Welding*

WELDS in large machine tools, drill and reamer shanks, drill rods, rock drills and automobile and truck axles should be as rigid as the parent metal of the stock itself. The reason for this is apparent for, if the welded joint were more flexible than the parent stock, it would be a matter of but a short time, until crystallization would take place at the most flexible point—the weld. In practice, the weld in such articles is more rigid than the parent metal, due to the pressure applied to push up the weld which compresses the metal, bringing the molecules closer together, more in the nature of a drop forging. Consequently, axles, drill rods, drills, etc., which have been welded invariably break at some other point than the weld. We have broken axles coming into our job welding department, some of which show two or three or even four previous welds which are still sound.

In welded joints in loom flyers, band saws, knife handles, mowing machine cutter bars, rug splitting knives, etc., the welds must be flexible, because some of the articles are under an almost continuous bending movement, as, for instance, band saws, flyers and rug splitting knives. This flexibility can be secured by annealing the weld, preferably immediately after it has been made. This can be done by several different methods, and the particular method chosen should be determined by the requirements the article must meet in service.

Welds in band saws are usually annealed immediately after welding, in the welder itself, by moving the clamping jaws somewhat farther apart than for welding, reducing the secondary voltage of the welder and heating the weld and sections adjacent thereto up to a dull red. In some cases one of such heatings is sufficient. In other cases, such as loom flyers, it is necessary to heat the piece in an oven and quench in oil, sometimes as many as six times successively, to secure the proper grain structure and flexibility in the welded joint. The great majority of resistance welds made in production require no annealing or quenching

*By H. A. Woofter, electrical engineer Thomson Electric Welding Co.

whatever. This is particularly true of the present practice in making automobile rims, truck wheels, bicycle frames, automobile cranks, farming implements, etc. All of the above come within the class of resistance welding known as butt welding.

Spot welds, in general, are not required to be flexible. The process takes the place of riveting, which is usually made as rigid as the riveter can make it. Seam welds, however, are sometimes required to be flexible in the plane at right angles to the face, to facilitate rolling or forming, as in the case of barrels, containers, automobile bodies, etc. The welds in mechanical tubing, although made by the straight butt welding process, take on largely the nature of a seam weld, and as such are required to be flexible, in that the tubing must stand bending on a fairly small radius, as in the case of frames for beds, etc. It is also common practice to make a seam weld by a series of elongated spot welds. These welds must be flexible, as in the case of welded aluminum sheets or steel sheets, which are later drawn or pressed into automobile bodies, containers, etc. Welds in copper rods must be flexible, since the rods are often drawn into smaller sizes, sometimes into small wire.

Thermit Welding*

ONE would naturally think that consideration of the relative stiffness of welds and parent metal would refer principally to the oxyacetylene and to the electric welding industries, and this is essentially so, because in these there is the enormous field of sheet, plate and tank welding where, due to the size and importance of the application and the undisputed advantage of welding over riveting, the entire procedure of the making and rolling of sheets might well be revolutionized to suit the newer process.

Thermit welding, on the other hand, has no such single enormous field of application. It occupies an important position, but one in which the application is more varied; for instance, like the acetylene and the electric jobbing work, magnified in size.

It is obviously impractical even to consider the manipulation of such a variety of parent metal as locomotive frames, crankshafts, stern frames, rudder stocks and the multitude of heavy iron and steel pieces and, therefore, the only place where such a procedure might be considered is in the material used in street railway rails, and here the requirement of wearing qualities under the rolling action of the car wheels is paramount.

In considering the softness or hardness, ductility or stiffness of a thermit weld, therefore, the parent metal must be taken practically as it comes. Fortunately, the thermit process lends itself perfectly to the production of a wide variety of steels with physical properties definitely within control. A slight consideration of the thermit process in its various ramifications will make this evident.

What Thermit Is

Thermit is fundamentally a mixture of the purest iron oxide and virgin aluminum which, when ignited in one spot, will progressively react and produce in a fraction of a minute any desired amount of molten iron on top of which floats the slag aluminum oxide, both at a temperature of more than 5000 deg. Fahr. This reduction process is similar to that in which ordinary iron is made, except that aluminum is used as a reducing agent instead of carbon and that pure iron oxide is used instead of the impure iron ore. Aluminum is a much more active reducing agent than carbon and consequently does not require the application of the prolonged heating used in iron and steel production.

Thermit welds can be produced with tensile strengths varying from 60,000 lb. per sq. in. to 110,000 lb. per sq. in. and no one knows how much higher, and with elongations varying from 33 per cent down to practically nothing. This simplicity of control makes it possible to design thermit mixtures which will produce steels either extremely ductile, with good tensile strength, or less ductile with very much higher tensile strength, and our present product has both of these properties, we believe, very well balanced, resulting in a tensile strength of about 75,000 lb. per sq. in. and about 25 per cent elongation.

We do this on the theory that the weld should be as nearly as possible the same strength and stiffness as the parent metal because, if it is less stiff or, in other words, more ductile, bending will be localized in the weld, the metal gradually fatigued and eventually fail; whereas if it is less ductile than the parent metal, bending will take place at the junction of the weld material and parent metal and again early failure may result.

In practically every case we believe that the welded structure should be uniformly flexible and that a change in flexibility from one point to another, due to fillets, cross members or other features of design, are the principal cause of failures and breakages, and are due to the localizing of bending stresses at one side or another of these stiff points. We strongly recommend that, wherever possible in welded structures, the weld material should be as nearly the same in its physical properties as the parent metal as possible, and that, if this cannot be accomplished, it would be better to have the weld slightly more ductile than the parent metal.

*By J. H. Deppeler, chief engineer Metal & Thermit Corporation, New York.

Small Profits in Iron Mining in Minnesota in 1923

GRAND RAPIDS, MINN., April 28.—The annual report of the mine inspector for this, Itasca, county, has just been issued. It shows a remarkable decrease in accidents from any previous period.

There are 46 mines in the county, all iron ore, and 28 operated during 1923. These moved, in ore and stripping, a total of some 20,000,000 tons of material. Eight men were killed in mines during the year, or one man for each 2,500,000 tons handled. The average number of men employed was about 4500, and the fatalities numbered only 8, with total serious accidents of 54 and minor accidents of 151. A serious accident is one in which the injured loses more than 30 days time, and the average time lost by such accidents was 66 days. The percentage of men killed to those employed was 0.176 per cent. Daily wages averaged $5.07, or an annual sum of $6,881,000.

It is interesting to note that the cost of wages, taxes and royalties, per ton of ore produced in the year, was about $2. This ore theoretically is worth this year at the mouth of the mine about $3, leaving $1 for all the items of overhead, fuel, supplies, depreciation, amortization and depletion, interest and profit. The items of amortization and depletion are costly, because most of these mines are open pit, and have had to carry on very extensive stripping operations, the charge for which, together with interest, has to be spread over the tonnages exposed for mining. Hence the item of profit for the year 1923 is scarcely worth considering.

The Lane-New York Co. of Memphis, Tenn., has just completed the installation of a new 1400-gallon pump for the Northern Ore Co. of Edwards, N. Y. This pump was ordered following flooding of the mine early in April. It was built in 10 days and received 12 days after the order was entered. A new Westinghouse motor is part of the equipment.

An order for 100,000 tons of iron ore from Germany was placed with the British Empire Steel Corporation, Nova Scotia. In consequence of this order another mine will be opened at Bell Island, Conception Bay, which will increase the number of men employed to 1050, Consul General W. Henry Robertson, Halifax, reports.

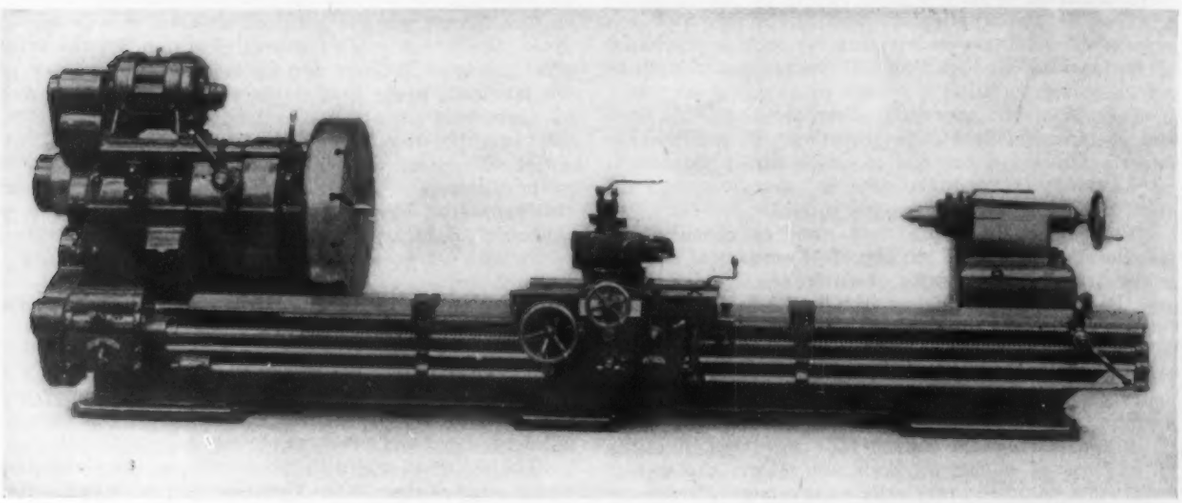
Self-Spacing Supports for Long Lead Screws of Lathes

Supports for the lead screw properly placed in an automatic way without reference to the position of the carriage and thus serving to give rigid supporting of long lead screws and all that this means for maintained alinement and accuracy have been applied to heavy duty lathes built by the R. K. LeBlond Machine Tool Co., Cincinnati. Two of these self-spacing lead-screw supports are provided for lathes of beds of 16 to 24 ft. in length and four go with lathes of bed lengths of 26 to 34 ft., with two more for each added 8 ft. of bed. The accompanying illustration shows a 36-in. lathe equipped with the supports. Heavy duty LeBlond lathes of 25-in. swings and larger and with bed lengths of 16 ft. and over are now regularly so equipped.

The action is automatic. The carriage in its travel along the bed automatically engages such supports as it may come in contact with, carries them to the end of the carriage travel and upon return releases them in their respective initial positions. They are thus always automatically returned to their proper positions, and not left at the ends of the bed. The operator thus does not have to move them along the bed by hand.

Each support is provided with a spring controlled hook pawl. This pawl engages a hardened locking stud on the carriage, or, as is the case when more than two supports are furnished, a similar stud on the adjacent support. Each pawl carries a release pin so located as to engage a similar pin fixed in the bed. As the support is carried along, either by the carriage or another support, these pins come into engagement, their engagement being such that it immediately disengages the pawl from the locking stud, the support thereby being left in its proper position. The pawl release pins and the bed pins are of varying length, in pairs, so that each pawl pin is engaged only by its corresponding bed pin. By this arrangement the supports are dropped in order in their respective positions.

The supports serve also to support the feed rod and spindle control rod. All three have generous babbitt lined bearings in the supports, a feature which contributes materially to the ease with which the supports may be moved along the bed without any binding and chattering.



Rigid Supporting of Long Lead Screws Is a Feature of the Heavy-Duty Lathe Above. Two supports, which are self-spacing and automatic in action, are provided for 16 to 24 ft. beds and four with bed lengths of 26 to 34 ft. Two more are added for each 8 ft. of bed

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Belgium's total exports of iron and steel products in 1923 amounted to 2,018,732 tons, while those of rails alone reached 203,786 tons, according to the Department of Commerce. Of the total exports of rails, South American countries took about 30 per cent.

Structural Iron Workers Strike in New York for Higher Wages

Structural iron workers of Manhattan, Brooklyn and northern New Jersey struck on May 1 for a daily wage of $12 instead of $10.50, and for a closed shop agreement. Although a few remained at work on smaller jobs, a number left sufficient to halt steel erection on a large share of the bigger jobs. According to Robert T. Thomas, secretary of the Iron League, which is the open-shop organization of employers, not more than 1000 structural iron workers left their posts. Since this is the only cloud on the construction business in New York, it is believed that an agreement will be reached without much delay.

"So far as the demand for the closed shops goes, it will not be considered under any circumstances," declared Walter Drew, counsel for the Iron League. "The open shop in the iron erection industry has been of benefit to the employers and the public. Wages have kept pace with the highest wages in the building industry. We have had 18 years of comparative peace in the industry and we want it to continue."

Savings Due to Purified Cutting Oil

Economics of the value of the purification of cutting oil are obtained from the experience of the Corbin Screw Corporation, New Britain, Conn., according to some facts compiled by the De Laval Separator Co. Tests before and after the installation of a De Laval oil purifier showed an increase of 20 per cent in the tool life. The improved lubrication and better cooling is said to have allowed an increase of 5 per cent in cutting speed and affected a 2½ per cent increase in production. The wages of two men on tool grinding were saved and the job of cleaning oil storage tanks was eliminated. The saving in oil is put at 5700 gal. yearly or enough to pay the cost of the purifier every nine months.

The facts and figures are credited to Charles Swanson, general mechanical engineer of the Corbin Screw Corporation, and furnished to the De Laval company by the A. C. Nielsen Co., engineering investigator, Chicago. The system supplies oil to about 300 machines and has been operated 11 hr. a day for about three years. Three storage tanks having a capacity of 12,000 gal. each are buried in the yard. From these tanks the oil is pumped to a 4000-gal. supply tank and is then delivered by pumps to the various departments requiring cutting oil.

Further Advances in Gear Standardization

Stub Tooth Standard Adopted at Gear Manufacturers Meeting—Progress by Other Committees—Addresses Made on Subjects of Pertinent Interest

MORE than twenty committee reports, nine addresses on subjects of wide interest to the gear industry, the annual banquet, the election of officers and four members of the executive committee, and an afternoon set aside for sight-seeing and plant visitation made up the program of the eighth annual meeting of the American Gear Manufacturers' Association held at the Lafayette Hotel, Buffalo, April 28 to 30. With addresses and constructive discussion on a wide variety of subjects, directly pertinent to practical problems of the gear making industry, attendance at the meeting was generously rewarded.

Officers and Executive Committee Members Elected

George L. Markland, Jr., president Philadelphia Gear Works, was reelected president. E. J. Frost, Frost Gear & Forge Co., Jackson, Mich., was elected first vice-president and B. F. Waterman, Brown & Sharpe Mfg. Co., Providence, was reelected second vice-president. Charles F. Goedke, William Ganschow Co., Chicago, continues as treasurer and T. W. Owen, 2443 Prospect Avenue, Cleveland, as secretary.

F. W. Sinram, Van Dorn & Dutton Co., Cleveland; H. E. Eberhardt, Newark Gear Cutting Machine Co., Newark, N. J.; A. C. Gleason, Gleason Works, Rochester, and A. F. Cooke, Fawcus Machine Co., Pittsburgh, were elected to the executive committee for a period of three years. Four companies were elected to membership, as noted in THE IRON AGE of May 1.

The fall meeting of the Association will be held Oct. 16 to 18, the place of the meeting to be announced at at a later date.

Work of Standardization and Other Committees

THE report of the general standardization committee, which is headed by B. F. Waterman, outlined the standardization activities of the several sub-committees as reported at the previous meeting at Lake Mohonk, N. Y. The reports to be made at the present meeting were also summarized and in closing, thought was directed to the opportunity of the association, and more particularly of the committees, in being the chief sponsor for gear standardization work, becoming leading authorities, nation-wide and perhaps world-wide, in their respective subjects.

The A. G. M. A. sectional committee of the American Engineering Standards Committee, of which Mr. Waterman is also chairman, submitted a report. The number on this committee has been increased and subcommittees on program, editorial, nomenclature, tooth form, spur gears, helical gears, worm gears, bevel gears, materials, inspection and horseepower have been appointed. A standard procedure of committeework has been proposed. Gear nomenclature has been increased by 10 definitions. The subjects of nomenclature, gray iron industrial gears, herringbone gears and brass and bronze gears will be taken up at the meeting of this committee, to be held May 23, in New York.

Tests of Strength of Gear Teeth

The report of the A. G. M. A. representatives of the A. S. M. E. research committee on gears, presented by E. W. Miller, Fellows Gear Shaper Co., Springfield, Vt., revealed that arrangements have been made with the Massachusetts Institute of Technology to carry out the first tests to determine the effect of varying degrees of tooth accuracy and varying velocities on the strength of gear teeth, as outlined in the paper by Wilfred Lewis in a paper on "Modern Problems in Gear Testing and the Proposed Testing Machine," delivered at the Cleveland meeting in 1923. The information gained by the research is felt to be essential to the solution of wear and noise problems. It is believed that the result of these tests will prove invaluable to industry.

The relation of the proposed research to the photoelastic method which is also being worked out at the Massachusetts Institute of Technology, has been discussed by the committee. It has been arranged with Hugo Bilgram, Bilgram Machine Works, Philadelphia, to make up patterns for the testing machines. More than $1,200 has been contributed by members of the association for this work.

At the previous meeting of the association, at Lake Mohonk, a general specification for steel castings was reported by the metallurgical committee, of which C. B. Hamilton, Hamilton Gear & Machine Co., Toronto, Canada; is chairman. As the report had not been before the members for the necessary 30 days it could not be passed as recommended practice. It was presented for action at the present meeting and adopted as tentative recommended practice.

This report provides for three grades of steel gears, case hardened, untreated and treated. To meet these three requirements two grades of steel castings were specified as follows: For case hardened gears a steel of 0.15-0.25 per cent carbon; for untreated gears a steel of 0.30-0.40 per cent carbon; for treated gears the same steel, with 0.30-0.40 per cent carbon. In all cases the phosphorus and sulphur limits of the A. S. T. M. class B castings are recommended, as follows: Phosphorus, acid process, max. 0.06 per cent, basic process, max. 0.05 per cent, sulphur, either process, max. 0.06 per cent. In all cases the same manganese limits as for S. A. E. low carbon forging steels are required, namely, 0.30-0.60 per cent.

This specification replaces that adopted in 1921, but continues in force the annealing specification of 1922.

The committee has considered that with maximum manganese held to 0.60 per cent, a water quench could safely be used for treated gears and give the desired physical characteristics, without the need of using a special analysis with higher carbon for this purpose. A maximum carbon of 0.40 per cent and a cheap quenching medium were considered to be to desirable.

The committee plans to have material on machinability and heat-treating furnaces for consideration at the next meeting.

Proposed Practice for Stub Tooth Accepted

A proposed recommended practice for stub tooth standard, submitted by the tooth form committee, of which H. J. Eberhardt, Newark Gear Cutting Machine Co., Newark, N. J., is chairman, was accepted.

It was emphasized that there are at least nine stub tooth systems now in use, where one would appear sufficient. The committee has received helpful support from interested members, and the proportions recommended are the result of unanimous agreement.

The stub tooth standard refers to involute gears

and the proportions are based on the basic rack of the system. In the new standard the addendum, dedendum and total height will be fixed proportions of the circular pitch and the proportions of the stub tooth adopted are identical with those of the recommended practice for herringbone gears.

A minimum clearance of 0.2/D.P. inches is recommended for new cutters and gears. There is correct tooth action, however, between gears cut to this new system and those cut to the older Nuttall system, the only dimension affected being the clearance. Where the proposed gear runs with the Nuttall there is a clearance of 0.1425/D.P., and where the Nuttall gear runs with the proposed gear the clearance is 0.2146/D.P.

Diametral pitches are to be used up to 1 D.P. and circular pitches from 3 in. C.P. on.

Standard proportions of the full depth tooth, regarded by many as of more importance than the stub tooth, were also included in the report. The full depth tooth proportions given are those now in general use, and include formulas for addendum, dedendum, working depth, total depth, pitch diameter and outside diameter in terms of both D.P. and C.P. Two other proportions of the full depth teeth, basic thickness on the pitch line and minimum clearance were added and accepted. Clearances and backlash will be worked out in cooperation with the A. G. M. A. inspection committee.

The sub-committee on tooth form made a progress report, in which it was pointed out that it was intended to consider three different tooth forms, one based on a composite rack which would mesh properly with gears cut with circular cutters, one based on a straight sided rack with 14½ deg. pressure angle and one on a straight sided rack with 20 deg. angle. The last two will have slight modifications from the theoretical form.

Herringbone Gear Proposal Rejected

Standards for herringbone gears cut with single thread hobs set at angle to axis of gear were submitted by A. F. Cooke, Fawcus Machine Co., Pittsburgh, chairman of the herringbone gear committee. Because it was felt that the recommended practice included recommendations that were covered in part by previous reports, the report was referred back to the committee for further consideration, the membership being requested to criticize the report and send recommendations to the chairman of the committee.

All the recommendations made were for herringbone-gears made from solid blanks, which practice requires a central groove for hob clearances; this groove width varies with the hob diameter and tooth depth and the number of threads in the hob. These determine very largely the angle at which the hob must be set. There seems to be a variation in hob diameter as made by various hob manufacturers which interferes with a minimum width of groove if stock hobs are to be used.

The sub-committee on railway and mine gears and pinions, of which W. H. Phillips, R. D. Nuttall Co., Pittsburgh, is chairman, has been working with the American Electric Railway Association in an effort to finish the standardization of jack pin holes in the gear web. At the meeting of the equipment committee of the American Electric Railway Association, a tentative set-up was made involving a reconsideration of the proposed standard for jack pin holes; the equipment committee requesting that this proposed standard be gone over and as far as possible, the maximum diameter of hole up to 3½ in. put in the web. No consideration is to be given to an effort to standardize the circle diameters, that is, the diameter of the circle on which the holes in the web are drilled.

The committee has been in touch with the blank manufacturers who are now going over these standards, and hope to get together with the equipment committee for final consideration of this subject the first week in June in New York City.

The bevel and spiral bevel gear committee, of which F. E. McMullen, Gleason Works, Rochester, is chairman, has obtained spiral bevel gear designs tabulated for 1 D.P. for all combinations according to the Gleason system of tooth design which was adopted in 1922 as a "suggested standard for future designs."

These tables, which are included in a book of 148 pages 8½ x 11 in. bound in cloth, and published by the Gleason Works, Rochester, contain all angles, diameters and dimensions necessary for the gear design on the basis of 1 D.P. Linear dimensions are readily obtained for other pitches by dividing the tabular values by the desired pitch. No attempt has been made to cover the spiral angle which must be selected to suit the pitch and length of face.

Non-Metallic Gearing Committee Active

A progress report on the making of fatigue impact tests using a new machine, recently made available, was made by F. G. Sorensen, Cincinnati Gear Co., Cincinnati, chairman of the non-metallic gearing committee. No definite agreement has been reached as yet as to what fiber stress to recommend, although it is expected that recommendations will be made at the next meeting. The committee is endeavoring to determine just what are safe loads in connection with gears of phenol condensation products. The work of this committee is difficult and its findings regarded as important.

A new table of keyways, keystocks and tolerances was submitted by the keyway committee, through its chairman, L. G. Nilson, Nilson-Miller Co., Hoboken, N. J. The recommendations are based on American practice and are intended for industrial gears. Special requirements are said to call for different specifications. One standard instead of two square keys for small and rectangular keys for large holes or shafts, is recommended. The table lists square keys up to and including 4 in. nominal and rectangular for 5 in. and larger. The tolerances specified are the same as recommended by the A.S.M.E. committee for keystocks, but for keyways only one-half. It was emphasized that the tolerances given are intended for industrial gears, one-direction drives and not for precision tools or reversible motors. The report was accepted as a progress report.

The library committee with E. J. Noble, Horsburgh & Scott Co., Cleveland, as chairman, is concentrating its efforts on editing some sheets for the A.G.M.A. loose leaf handbook, several of which were distributed at the meeting. The aim is to provide a complete handbook, and a start is being made with data that is familiar to all, giving tables that are already widely used. Suggestions for data for future sheets were invited. As the various committees adopt standards it is intended to put these out in data sheet form, also.

The possibility of issuing a bulletin periodically, listing all articles of interest to the gear industry appearing in current magazines, is being investigated by the committee and it is hoped to start this bibliography soon. The work of the committee was commended and its progress report accepted.

The differential committee, headed by S. O. White, Warner Gear Co., Muncie, Ind., has sent out a blueprint showing a proposed two-pinion differential case, on which suggestions for standardization are invited.

Other Committees Report

The inspection committee, which is working on cutter inspection, submitted a progress report.

A summary of proposed procedure was outlined in a report of the special committee on new gear applications, of which C. T. Roantree is chairman. The fields of research have been classified into industrial applications, which include machine tools, foundry and forge operations; public utility applications, which include power plants, water works, railroads; building and general trades; and merchandising field, which includes sewing and washing machines, house and farm lighting apparatus, etc. These main classifications will be subdivided, and the uses of gears in the several fields considered in detail.

E. S. Sawtelle, Tool Steel Gear & Pinion Co., Cincinnati, in presenting the report of the industrial relations committee suggested that future meetings be conducted as "old-fashioned testimony meetings," members of the association discussing what they have done

in group insurance, welfare work, proper sharing, attendance bonus, piece work and similar activities. It is evidently desired to have tangible experience directly pertinent to the gear industry presented, rather than elaborate discussions from the professional management viewpoint.

Addresses Made on Commercial and Other Problems of Gear Industry

COST accounting, advertising, industrial relations, the buying habits of industry and the place of the gear manufacturer in industry, were dealt with in as many addresses. Addresses on practical metallography and the application of spiral bevel gears were given, and a paper on gears and pinions of equal strength submitted. There was also an address dealing with British gear practice.

Gear Makers Rendering Service

The position occupied by the gear manufacturer in the broad field of industry and the manufacturing service he is rendering, were analyzed by L. G. Hewins, sales manager, Van Dorn & Dutton Co., Cleveland, in an address on "The Gear Manufacturer Needed." Mr. Hewins emphasized particularly the possibilities of economical service to the "middle group" of consumers of gears.

In analyzing the market of the gear makers, three classes of consumers were designated. The first were those requiring a few gears occasionally, either for replacement or experimental work. The second class is made up of companies using somewhat larger quantities of gears in connection with equipment they produce or operate. The third class includes manufacturers using large quantities of the same kinds of gears, day in and day out.

Of the third class, it was said that being in a position to control their production, these manufacturers can install highly specialized equipment that gear makers would not be justified in doing, not knowing how long the business might be enjoyed.

That part of the market made up of the second class, the large group of manufacturers making equipment that requires gears in various quantities, some of whom were said to be attempting to produce their own gears, with varying success, were discussed in detail. This group requires many different types of gears which are supplied by as many different classes of gear manufacturers.

Some manufacturers in the second group were said to have had their own gear equipment from the beginning. Others in this group have been encouraged possibly, he said, to install gear cutting machinery on account of what they considered slow delivery, high price, or some other form of poor service on the part of gear makers. "Although it can usually be shown that economically these manufacturers were not justified in the addition of a gear department," said Mr. Hewins, "they have done it, and some of the responsibility can be laid at the gear manufacturer's door. With a little more vision, we might have satisfied these customers, have saved them money, and increased our own business."

The procrastination of some manufacturers in ordering gears, holding off until the rest of their product was practically ready for the gear installation and finally coming to the gear maker for deliveries "day-before-yesterday" was emphasized. This demand for rush delivery was pointed out as meaning the picking up of material wherever available, with little opportunity to get the best price, the rushing of the work through the plant at an increased production cost, and frequently at some sacrifice in quality.

This situation was pointed out as affording excellent opportunity for machine tool makers to step in and present some apparently convincing arguments why the manufacturer should install gear equipment. It was stated that in most of these cases, however, the manufacturers can purchase better gears at lower prices from one of the reputable gear manufacturers.

Disadvantages of "Home Made" Gears

Several disadvantages involved in the operation of a gear department by manufacturers of the middle group were discussed. Lack of experience was cited as frequently making it difficult to get the quality desired, or as good as obtained from the gear manufacturer. Idleness of the equipment a large part of the time and the expense incident to this idleness was also cited, and in plants having only enough work to keep gear making machines busy 50 to 75 per cent of the time, the tendency for men on these machines to slow down so that the work will last a full year, was emphasized. Slow turnover on material and labor investment was another factor pointed to, and in the case of manufacturers under the necessity of stepping up their production schedule, the flexibility afforded by having a dependable outside source for their gears was stressed. In this connection Mr. Hewin said, "The gear manufacturer with better plant facilities and serving hundreds of customers can adjust himself to these peaks and valleys. He is a shock absorber both in times of overproduction and underproduction. Many manufacturers appreciate that during periods of depression the gear manufacturer is holding the bag rather than themselves."

Gear equipment used only part time and becoming obsolete long before it is worn out, and the use of such more-or-less obsolete machines that require more time for certain operations than those of the gear manufacturer who has more up-to-date equipment, was also emphasized. It was also pointed out that many manufacturers have concluded that they can use their capital more advantageously in exploiting their own sales, than by having it invested in expensive gear-cutting equipment.

Middle-Group Served Economically by Gear Industry

"Is there any good reason," said Mr. Hewin, "for any manufacturer in the middle group going to the expense of installing gear equipment, when throughout the country he can find experienced gear companies, with ample facilities; which have devoted years of effort and study to the production of gears; which, with intelligent planning can give him what he needs in the way of quality and service, at a cost below what can produce his own gears; and where he can consult with engineers who will give him the benefit of experience accumulated in years spent in the gear business?"

Interest not only in selling gears, but also in giving the customer the benefit of experience concerning design, material heat-treatments, etc., was advocated, and the practice of Mr. Hewin's company in this respect was outlined.

Gear manufacturers were classified in four groups, and it was pointed out that as far as possible effort should be confined to the work for which one is equipped, regardless of how badly the business might be needed. These groups were given as follows: (1) Gear makers particularly equipped for rush jobs; (2) companies which can handle large quantities of gears to better advantage, specializing on cast iron or untreated steel gears, and not, therefore, needing heat-treating facilities; (3) companies specializing on certain classes of quantity work, either large or small gears; (4) companies specializing on high-grade gears for applications where the greatest accuracy and strength is required,

(*Continued on page* 1399)

RECOVERING FUEL FROM ASHES

Separating Combustibles by Flotation—Machine Pays 300 Per Cent on Cost

BY STERLING H. BUNNELL

AN important development of the fuel shortage in European countries has been an intense interest in discovering new sources of fuel supply and in utilizing fuel previously wasted.

In practical furnace operation, the ash which works through the grates or out of clinkering openings contains a considerable amount of combustible. The quantity of oxidizable material in ashes runs up to and over 50 per cent or more in locomotive ash, from 35 to over 50 per cent in gas works ash, and in industrial furnaces and power plants, from the highest of these figures down to the rarely excellent proportion of 8 to 10 per cent reached in an occasional modern large central station plant under test conditions. Considered as fuel, furnace residues contain about 50 to 90 per cent of unburnable silica, so that they grade far below the worst usable coal. Some means must therefore be employed to separate the excess of silica, when the remaining portion of the ash becomes a high-grade coke, worth the market price of such fuel.

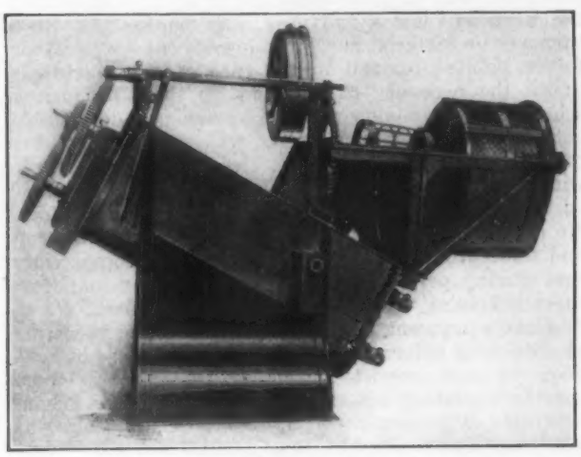
Several attempts have been made to take advantage of the difference in the specific gravity of the porous, air-filled coke, and the dense clinker and ash, and by flotation to make the desired separation. The density required to float coke is about 1.25, taking water as 1. There is no cheap, chemically inert liquid of the required density. If the separation is to be made in water, some sort of jig, or a series of high pressure jets, must be employed to throw the coke into a conveyor before it has time to sink much below the surface; and nice regulation is necessary to catch all the coke while letting all the clinker escape through its more rapid sinking. Separation by simple floating of the coke in a heavy fluid is simple and easily managed. The engineers of Benno Schilde Machinery Co., of Hersfeld, Germany, developed the necessary flotation medium in the form of a mixture of clay or loam and water—a thin mud—and with a tank and a couple of conveyor screws, they produced the "Kolumbus" coke separator, a machine which has nearly reached its five hundredth installation in the short space of three years.

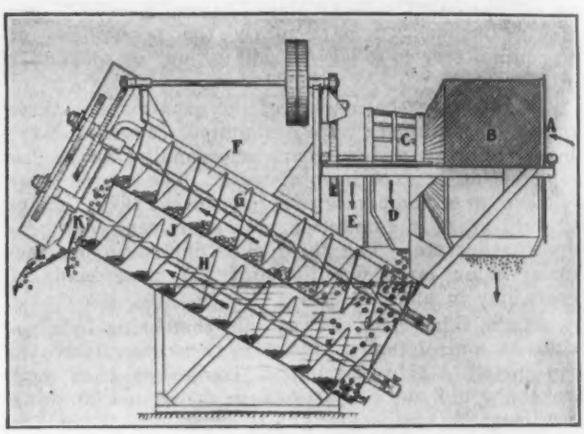
The machine is in operation almost as simple as an ash-sifter. The ashes are dumped into its receiving hopper by the ordinary ash transport railway or conveyor belt of the plant. A slow-running continuous bucket elevator delivers the ashes to the revolving screen which forms the first element of the separating machine. This removes the fine dust which generally contains little or no combustible, and also throws out any large clinker, broken bricks or other accidental lumps which would not pass freely through the separating tank. The bulk of the ash falls from the opening of the screen into the separating fluid. The coke remains on the surface and is removed and delivered by the upper screw conveyor. The incombustible clinker sinks, and is removed by the lower screw conveyor and delivered through a separate chute.

The process results in the recovery of practically all of the combustible in the ash, in the form of coke which is readily salable at the local price of coke. The quantity of this amounts to 20 to 50 per cent of the total ash, and its sale value generally pays the entire cost of the plant in four to six months' operation. The remaining ash to be removed from the plant is thus reduced to half or two-thirds; but this separated, noncombustible material in two graded sizes is now readily salable for use in concrete. Many of the Kolumbus separators in use in Europe are operated in connection with cement-brick molding machines to make building material for plant extension or for sale to the building trades. The cost of such brick is generally under $10 per thousand. They are as strong as clay brick, are much more fire resisting and, like other concrete, grow stronger and harder with age.

The recovered coke, if only refired in the plant, makes a saving of 4 to 8 per cent of the total fuel cost, but if the coke is sold as such, its price will buy two or three times as much soft coal, so that the saving in operating cost is proportionately larger. The separating system is in use by a wide range of industries, and seems particularly valuable for foundries, where the clinker could be passed over a magnetic separator and iron also recovered.

The machines are made in three sizes, the smallest has an hourly capacity of one ton of ashes, and is generally fed by one man shoveling direct into the revolving screen. The largest size has a capacity of 8 tons of ashes per hour, and is thus suited to plants having 50 to 80 tons of coal per hour on day load only, or proportionately less if the plant operates day and night, and the ash machine during one day shift only. Ash Reclaiming Machinery Corporation, 347 Madison Avenue, New York, holds the American rights under contract with Benno Schilde company.





The Ash is Fed at A into the Revolving Screen B, Which Allows the Fine Ash Dust to Drop Out; then Through the Cage C, the Granular Ash Falling Into the Separating Tank While Any Large Lumps Fall Through Chute E Outside of the Tank. In the earth-and-water separating fluid the combustible floats and is removed by conveyor G, and the incombustible clinker sinks and is removed by conveyor H. The earth-and-water mixture is kept near the level of the open top of the small square box seen on the tank. This opening serves for testing the specific gravity of the fluid by inserting a hydrometer

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Rates on rough steel castings in carloads from Attica, Ind., to Chicago and Peoria, Ill., St. Louis, and Cincinnati, Columbus and Mansfield, Ohio, are not unjustly discriminatory or unduly prejudicial, the Interstate Commerce Commission held in an opinion announced last week. In doing so it dismisses the complaint by the National Car Coupler Co., Attica.

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THE IRON AGE

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Pittsburgh Plus

EXTRACTS from the report of Examiner J. W. Bennett in the Federal Trade Commission's "Pittsburgh plus" complaint were given in THE IRON AGE last week, and an extended résumé of the findings is published in this issue. The report is unfavorable to the Steel Corporation, the nominal if not the sole defendant in the case. The testimony taken is understood to cover 50,000 typewritten pages, besides the exhibits.

The question arises, if an effort to show that the "Pittsburgh plus" practice is illegal takes 50,000 pages of typewriting, how many pages will it take to define what the Steel Corporation and its competitors may legally do? It is an eminently practical question, for steel is a vital necessity and has to be sold. If it cannot be sold one way, it has to be sold another way. The steel market is no simple affair. The best posted and most able steel men sometimes make mistakes in attempting to judge what the steel market will do in certain circumstances.

It would be an elementary matter, apparently, to decree that a steel mill must not quote a price to a prospective customer which is a Pittsburgh price plus the rail freight from Pittsburgh to point of delivery, but the steel mill does not necessarily do that anyhow. The regular published price list on one important steel commodity does something that is distinctly different. It quotes uniform delivered prices to all points which take a freight lying between certain limits; for instance, all delivered prices are the same when the freight from Pittsburgh lies anywhere from 30¼ to 40 cents per 100 pound. This commodity involves hundreds of thousands of tons a year. To decree that each mill shall quote an f.o.b. mill price would change the form but not necessarily the substance, for the mill could figure on the Pittsburgh basis and make the price accordingly. If it be undertaken to hold that a mill is not entitled to know where the material is to be delivered, that raises an entirely fresh point in law, and one that will be contested as a separate matter. Many sellers would be interested who are not concerned at all with the "Pittsburgh plus" case of steel.

Even the Federal Trade Commission case, however, is only well started. It still has to be argued, and the commission can hardly formulate an adverse decision that will not be taken into the courts to determine the commission's power. Still after that would come the question whether in their sales the steel producers were conforming to the decision.

The greatest complaint of the Western buyers of steel in this matter was in the case of bars, shapes and plates. For two and a half years or more the point has not existed, for the Chicago market has been on its own basis in bars, shapes and plates. The "Pittsburgh plus" system has been yielding in response to conditions.

To make the case more interesting and complicated, the Eastern trade has been preserving more or less the form of "Pittsburgh plus" while it has eliminated the substance. The Eastern market has quoted prices on bars, shapes and plates, which on their face seemed to represent the Pittsburgh base price plus freight from Pittsburgh to the point of delivery; but in actual fact, if the freight from Pittsburgh were subtracted from the delivered price, there was generally left a lower base price than was ruling at the time in the Pittsburgh market.

If the matter really gets away from technicalities and down to practical questions of market stability, much room for argument will be found on each side. When the steel market grows weak the "Pittsburgh plus" system, in actual practice, tends to make it weaker, for if prices are shaded in a certain territory, buyers in other territory take the position that this means them also. They feel they are entitled to the same concession, wherever they are located.

The Government in Business

THE American Government in all of its forms conducts the greatest of all businesses, viz., attention to the common affairs of the people, which absorbs something like one-eighth of their income. Even before the war the Aldrich committee told us that the institution of only ordinary efficiency would save us something like 25 per cent. The State and municipal governments could do likewise.

Turning to a detail, though a very great one, the Federal Government carries on an enormous

business in conducting the postal service. No one would recommend that it should be farmed out to a corporation; but if it were, who would doubt that the work would be done with far more economy and efficiency?

For a year or two during the war the Federal Government administered the railroads and added about a billion dollars to the cost. Subsequent to the war there was an iridescent dream of establishing an American mercantile marine, nationally owned and operated, which cost about three billion dollars before failure was pronounced.

With such records staring us in the face, why should there be ever any ideas of nationalizing industries, or of the Government assuming to do anything that is not absolutely necessary? Inefficiency is the penalty of collectivism, and the greater the body politic the more is the inefficiency. The Government cannot even conduct itself like a corporation. It generally cannot employ the best brains, for it will not pay adequate salaries. If it offered better terms the places would become the honey pots of the job hunters even more than at present. A good man in the Government rarely can act with prompt decision. If he does he is likely to invite the attacks of scandal mongers and risk a hundred dangers.

We should not for these reasons relax our efforts to improve the Government service and bring about many obvious reforms; but we should always recognize that there is an inherent waste which can never be eliminated and that it is a price we pay for having government and for doing collectively many needful things that cannot be done individually. This is a powerful reason for avoiding socialism and everything leading in that direction.

Stainless Iron as an Engineering Factor

THE corrosion of steel, its cause and its prevention have been discussed for many years. Technical societies have devoted symposiums to the problem; metallurgists have attempted its solution, and economists and others have computed the loss due to the ravages of rust. Some of these computations have gone to figures that sound fanciful and that by no stretch of definition could be classed as statistics, even though they be taken as representing material removed from use because of corrosion and not to the actual loss by corrosive action. But whatever the real amount, as an economic factor the loss is enormous and menacing.

No material has been made that more closely meets the requirements in respect of corrosion resistance than does stainless or "rustless iron." A searching investigation of its manufacture and properties has been going on in this country and in England for the past two years. It has been found possible to make it in any form in which mild steel is used. Its adaptability to engineering uses and its endurance for many years without protective coatings appear to be established, as was indicated in detail in THE IRON AGE of April 24.

Problems of cost and the adjustment of patent complications are the chief present deterrents. Whether the direct process, where chrome ore is the source of the chromium, or the indirect process, where low-carbon ferrochromium is the governing factor, will ultimately win remains to be determined. Harmonizing of the patent conflict is to be expected, since large interests are involved, and it is not improbable that means will be found to cheapen production so that within a year or two rustless steel will be available commercially.

The Need of Better Thinking

A FEW years ago we were much more addicted to health fads than we are just now, skipping breakfast, almost interminable mastication, repudiation of the great art of cooking, etc.

In commercial and industrial affairs we are also prone to be faddish, only we do not like to admit it. Before the war there was a decidedly popular fad, that business in the United States could not be really successful until the Sherman law was repealed or greatly modified. Since the war we have had a series of notions which may have been good in themselves, but the vogue of which suggested the fad principle.

In the early part of 1920 we had much talk about the need of greater production. Men repeated the statement without reasonable investigation or inquiry, without "checking up," so to speak. Afterwards we found that in a number of lines there had been no lack of production, that the apparent scarcity had been due to sellers holding back supplies or consumers hoarding. Then late in the year we had a way of saying there was "a strike of buyers" against the high prices. It would have been nearer the truth to say that the money of buyers had run out, and that they ought to have gone on strike long before; thus they would have had some money left to spend when they had won their strike.

Perhaps the most dangerous of our present-day fads is amending the Constitution of the United States. It has almost come to pass that if a thing cannot be done any other way the Constitution must be changed. The Constitution ought to be our most stable thing. It was intended so to be.

Another of our present-day fads is saying that people do not work hard enough. Few utterances give the individual more pleasure than the smugly complacent remark that we (i. e., the one who makes the remark) will not get along right until people (i. e., all others) are willing to work harder.

There is reason to believe that we are today more deficient in hard and right thinking than in hard and right working. The employer who has it that his men are not doing right and he will be unable to make the profits to which he is entitled until they do, needs to think. He needs to recognize first that he is not "entitled" to anything except what he is able to secure with his brains. He had better conclude that harder work on the part of his men is a forlorn hope and that he should adopt better appliances and methods.

If men had done more thinking in the early months of 1920 they would have seen that the

trouble was not so much lack of production as too much spending of the "come easy, go easy" sort. Some men saw this; many did not. Later the apparent "strike of buyers" would have been recognized for what it was, but some men held to their notion so strongly that they wanted laws passed or perhaps a constitutional amendment—against "cancelitis."

Our unwillingness to think is shown by the fact that many men believe in Secretary Mellon's tax revision plan only because we are unfortunately unable to eliminate the tax exempt securities by constitutional amendment. If we could, of course we should at once, yet little thought is required to recognize the absurdity of one branch of our Government taxing another branch. The Constitution is quite right as it stands. The real testimony of the facts is simply and clearly that the high surtaxes are wrong in principle. They would be just as wrong, only they would not be so unremunerative, if we did not chance to have these tax exempt securities.

ATTENTION is directed again to the large quantities of black steel sheets purchased by Japan from American makers in recent months and years. The peak of the movement came in 1922 when about 74 per cent of our total black sheet exports went to Japan, as against 66 per cent in 1921. Last year the percentage was 54, and in January this year over 93 per cent of the month's shipments had a Japanese destination, in view of the needs caused by the earthquake. Previous to the war Japan purchased almost no black sheets from this country. During the four war years her proportion of our exports was 97,860 gross tons out of 522,840 tons. But in the five years since the war that rate was nearly quadrupled, going above 50 per cent of the total, or to 453,300 tons out of 894,460 tons exported. Since January last Japanese demand has fallen off, being only 39 per cent of the total sheet exports in February, and in March less than 10 per cent. It can be appreciated that such a falling off is enough to be contributory to the easing of prices that has been a matter of comment in the domestic sheet market in recent weeks.

The Iron Age and Its Readers

THIRTY-EIGHT of every hundred readers of THE IRON AGE are operating officials of iron, steel, metal and metal working plants. They are general managers, factory managers, superintendents or production managers. Thirty-four of every hundred are company officers, such as presidents, vice-presidents and treasurers. Sixteen are directors of purchases. Twelve are engineers responsible for design or construction, as employees or as independent consultants.

Four-fifths of the subscribers are in eleven States. These have three-quarters of the metal working plants of the country and do seven-eighths of the business.

Considering our subscribers in another way, 47 per cent are manufacturers of machinery, automobiles, farm implements, electrical specialties, castings, forgings, stampings, hardware, etc., including also the machinery departments of manufacturers of non-metal products. About 15 per cent are makers of iron and steel, miners of iron ore and producers of non-ferrous metals. Between 13 and 14 per cent are jobbers of metal, machinery and mill supplies. About 8 per cent are engaged in steel building construction and the making of cars, tanks, boilers, ships, etc. Five per cent accounts for railroads and public service corporations. Two per cent are exporters. Between 3 and 4 per cent of the subscribers are colleges and libraries.

Killing the Goose

MANY times in the past four years we have called attention to the exorbitant demands of workers, pointing out repeatedly that labor in the coal mines, on the railroads and in building construction has been out of line—always on the upward side—and that its demands appear to be insatiable. A news article last week, referring to advances in wage scales adopted at the annual convention of the Amalgamated Association of Iron, Steel and Tin Workers of North America, is further evidence of the same sort coming from another field of labor.

Announcement was made last week by E. M. Statler, president of the hotel company which bears his name, that the proposed Statler Hotel in Boston will not be erected until prices of building labor and materials register a material reduction. Plans for the hotel were complete and the financing had been worked out to the smallest detail. Continually pyramiding costs, however, had made it evident that a profit could not be earned on a hotel built under present conditions and the indefinite suspension of the project was the result.

Perhaps the same labor situation, with its large element of uncertainty as to what the next few months may bring forth, was responsible for the wide variation in bids received last week by the New York Transit Commission for a proposed new subway linking Brooklyn and Queens. Four bids were published, as follows:

$3,948,830.50
4,974,296.25
5,919,509.10
6,218,282.50

The second bid is $1,000,000 greater than the first—more than 25 per cent; the third bid is almost $1,000,000 greater than the second and is 50 per cent higher than the first; the fourth represents an increase on the first of 57½ per cent. To what extent the low bidder was "taking a long chance," with the possibility of being unable to complete his contract and of being forced into bankruptcy, we do not now know. But inasmuch as labor forms the large item in all work of this character, it must have been doubts as to what labor would do that produced the great disparity in the other bids.

STRIKE NOT EXPECTED

Sensational Reports as to Amalgamated Demands Do Not Cause Alarm

PITTSBURGH, May 5.—Suggestions in the sensational press of the possibility of a complete shutdown of the bar iron, sheet and tin plate mills which are operated under an agreement between the owners and the Amalgamated Association of Iron, Steel and Tin Workers of North America, on June 30, next, because of the demands made by the wage scale committee of the latter and adopted at its recent annual convention here are not disturbing to M. F. Tighe, its president. While admitting that the demands are stiff and that they will find strong opposition from the manufacturers who will confer with the Amalgamated committee at the annual wage scale conference in Atlantic City, beginning May 26, he believes there will be an amicable settlement.

The first conference will be devoted to the sheet and tin plate scales and the meeting has been scheduled for an early date so that there may be plenty of time for thoroughly discussing the matter before the present agreement expires by limitation on June 30. Failure of an agreement on the bar iron schedules, which will be taken up immediately after there has been sufficient discussion of the sheet and tin plate scale to determine whether an agreement can be reached, does not mean the shutting down of the mills working under an arrangement with the Amalgamated, as the agreement in this case provides for continuing an expiring agreement for a period of 60 days in case the scale conference fails of settlement, this to permit of additional negotiations.

Mr. Tighe has no illusions about the proposed wage scales, but the suggestion that the manufacturers were greatly agitated when they were published caused him to smile. It is well known that not a few, if not the great majority of the changes in scales and working conditions originate with the subordinate lodges and that if such changes are to be embodied in the wage scales drawn up and adopted by the annual convention of the Amalgamated Association and presented at the annual wage conference, copies must be presented to the manufacturer at whose plant the members of the resolve-making lodge are employed by March 26, preceding the wage scale conference. It also appears that a good many copies of the complete wage scale committee recommendations were in circulation even before they had been voted upon at the recent convention. Perhaps the greatest bit of confirmatory evidence that the subscribing manufacturers were not greatly shocked is the fact that arrangements have gone forward for the holding of the wage scale conference between the manufacturers and the Amalgamated committee. Certainly, it would be idle to hold such a conference if it was apparent in advance that the issue had been settled and that there was no solution but a complete refusal of the manufacturers to even discuss the matter and the calling of a strike by the workmen to enforce their demands.

The Amalgamated committee has plenary powers in the conference and can decide upon hearing the manufacturers' side of the story whether the demands formulated by the wage scale committee should be pressed. The whole matter resolves itself merely into the presenting of the demands by the Amalgamated committee, the manufacturers' response and the subsequent discussion. The Amalgamated demands are exorbitant; that is not denied even by Amalgamated officials, but it is apparent that the animating thought behind them is not a strike if the demands are not granted, but rather the application of the theory that the way to secure something is to ask for a great deal more than is actually expected.

EXPORTERS TO MEET IN BOSTON

Foreign Trade Council Convention to Be Addressed by President Farrell—Keynote Is Need for Wider Markets

The eleventh annual foreign trade convention of the National Foreign Trade Council, at Boston, June 4, 5 and 6, will include discussion of the profit side of export, how to get more business, wider markets, promotion of trade by banks and export advertising. James A. Farrell, president, United States Steel Corporation, will speak on "Wider Markets for American Prosperity."

Among other speakers will be Howard Coonley, president, Walworth Mfg. Co., Boston, on "New England's Opportunity"; T. R. Snavely, chairman, School of Economics, University of Virginia on "What Should be Included in a Single General Course on Foreign Trade"; Thomas W. Pelham, general counsel and sales manager, Gillette Safety Razor Co., Boston; Walter F. Wyman, Carter's Ink Co., Cambridge; J. Anton de Haas, School of Commerce, New York University; Eugene Van Cleef, foreign commerce division, Ohio State University, Columbus; Chauncey D. Snow, foreign commerce department, Chamber of Commerce of the United States; Henry Howard, foreign trade committee, Cleveland Chamber of Commerce; Charles E. Spencer, Jr., vice-president, First National Bank of Boston; Charles P. Clifford, vice-president, First National Bank of Chicago; C. M. Wynne, vice-president, Overseas Trading Co., Chicago; F. B. Shipley, president, National Council of American Importers and Traders, New York; Ralph T. Hale, president, New England Importers and Traders' Association; Paul R. Mahony, director of foreign sales, Wahl Co., New York; Carl F. Propson, manager, sales promotion department, Bausch & Lomb Optical Co., Rochester.

At a luncheon on the first day of the convention "Student Travel in Foreign Lands as an Adjunct to Foreign Service Training" will be discussed. A dinner will be held by the Export Managers Club, addressed by A. Schoonmaker, president, whose subject will be "Exporting." A luncheon will be given June 5 under the auspices of the American Manufacturers' Export Association. On Saturday, June 7, convention delegates will be taken on an inspection of Boston Harbor and nearby points of interest.

Merchant Iron Furnace at Everett, Mass.

In connection with the recent sale of $5,000,000 coupon three-year 5 per cent notes by the Massachusetts Gas Companies, Boston—the initial financial step toward the erection of a blast furnace at Everett, Mass., for the Mystic Iron Works—it is announced that it is planned to build eventually four furnaces. Freyn, Brassert & Co., Chicago, engineers, are in charge of details. The plant when completed will closely resemble one recently constructed in Holland by the same engineers.

The initial unit will be a 400-ton blast furnace together with the necessary auxiliary equipment and appurtenances, rated to produce approximately 150,000 tons of pig iron per year from domestic and foreign ores. The furnace will be served by four hot blast stoves, and necessary steam for operating the steam turbine driven centrifugal blowers, electric generators, pumps and other auxiliary machinery will be provided by a boiler plant. These boilers also will serve the requirements of the company's by-product coke oven plant. The blast furnace gas will be purified for efficient operation of the hot blast stoves and boilers.

Double strand mechanical pig casting machinery will be used. Blast furnace slag will be used to fill in on the company's property. There will be an ore dock on the Mystic River, allowing the direct unloading of ore and limestone from vessels. The ore and limestone will be stored in a stockyard served by an ore bridge. Necessary coke will be produced in the company's existing by-product coke oven plant and will be delivered by rail to coke bins at the blast furnace.

Dullness Outstanding in European Markets

Hand to Mouth Buying Prevails—British Prices Lower in Galvanized Sheets and Tin Plate—Over-Production Feared in Germany—France Struggling with Foreign Competition

(*By Cable*)

LONDON, ENGLAND, May 6.

PIG IRON is quiet but it is anticipated that there will be a revival of demand in the near future, as fair export inquiries are arriving. Makers generally are not keen to reduce prices, owing to possible increased fuel costs.

Hematite is firm and stocks are well liquidated. Foreign ore is dull. Bilbao Rubio nominally is 23½s. ($5.15) c.i.f. Tees.

Finished steel is dull but prices are being maintained at current levels except in isolated cases. There is increased activity reported in the engineering and construction departments. Export and merchant sales are dull, with moderate demand for small tonnages, but substantial parcels are lacking.

Continental markets present a difficult problem. Some Belgian producers are inclined to reduce their prices; others are making little effort. Germany is competing more freely. Thin plates (⅛ in.) have been sold at £8 5s. (1.61c. per lb.) f.o.b. Germany is reported to be negotiating for the purchase of 100,000 to 125,000 tons of Wabana iron ore. Belgian ironmasters are taking a gloomy view, some talking of restricting output shortly.

Tin plate is quiet and easier on a weaker tendency in tin. Makers are free sellers at 24s. ($5.26) basis, I C, f.o.b. Second-hands are being offered for third quarter shipment at 23s. 9d. ($5.20) basis, I C, f.o.b.

Galvanized sheets are dull and weak. There is some Indian buying in small parcels, but no sign of individual substantial tonnages.

Black sheets are quiet, but the works are well supplied with orders.

GERMAN IRON AND STEEL BETTER

Improvement Reported in Operations—Prices Higher—Some Export Business Being Done

(*By Radiogram*)

BERLIN, GERMANY, May 5.—Iron and steel trade is improving, smelting and rolling mill concerns having work for three months. They report slackening of new orders, particularly for bars. The pig iron syndicate (Roheisenverband) has increased foundry iron prices by 2 to 9 gold marks per ton (48c. to $2.17), declaring that existing prices are 10 per cent below cost of production. If this continued it would compel the smelters to blow out their furnaces.

Since the improvement in franc exchange, the French and Belgians are unable to compete in Germany. Thyssen has received large Swedish orders for steel rails. The Solingen steel companies report an increased domestic but weak foreign demand.

In the machine tool branch in the occupied territory activity is increasing, but revival of production is everywhere retarded by abnormally dear credit.

LUXEMBURG BUSINESS DIFFICULT

Exchange Market, Outside Competition and High Costs Hold Transactions to Minimum Tonnages

LUXEMBURG, April 25.—The iron and steel market has been keenly affected by the fluctuations that have been upsetting the exchange market during the month of March. The pressure of foreign currencies caused prices to rise in the first 10 days, but since the recovery of the franc a sharp and continual decline in the rates for metallurgical products has continued. In such con-

British and Continental prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.38 per £1, as follows:

Durham coke, delivered	£1 8s.	to £1 10s.	$6.13 to	$6.57
Bilbao Rubio ore†	1 4		5.26	
Cleveland No. 1 foundry	4 17½		21.35	
Cleveland No. 3 foundry	4 12½		20.26	
Cleveland No. 4 foundry	4 11½	to 4 12	20.04 to	20.15
Cleveland No. 4 forge	4 11	to 4 11½	19.93 to	20.04
Cleveland basic	4 12½		20.26	
East Coast mixed	4 19½	to 5 0	21.79 to	21.90
East Coast hematite	4 19	to 5 0	21.68 to	21.90
Ferromanganese	17 0		74.46	
Rails, 60 lb. and up	8 10	to 9 10	37.23 to	41.61
Billets	8 0	to 8 5	35.04 to	36.14
Sheet and tin plate bars, Welsh	8 18¾		39.15	
Tin plates, base box	1 3⅞	to 1 4	5.23 to	5.26
			C. per Lb.	
Ship plates	9 5	to 9 15	1.81 to	1.91
Boiler plates	13 0	to 13 10	2.54 to	2.64
Tees	9 10	to 10 0	1.86 to	1.96
Channels	8 15	to 9 5	1.71 to	1.81
Beams	8 10	to 9 0	1.66 to	1.76
Round bars, ¾ to 3 in.	10 0	to 10 10	1.96 to	2.05
Galvanized sheets, 24 g.	17 0	to 17 5	3.32 to	3.37
Black sheets, 24 gage	13 0	to 13 5	2.54 to	2.59
Black sheets, Japanese specifications	15 5		2.98	
Steel hoops	12 10	& 12 15*	2.44 &	2.49*
Cold rolled steel strip, 20 gage	17 2½		3.35	

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(*Nominal*)

Foundry pig iron:				
Belgium	£4 4s.	to £4 5s.	$18.40 to	$18.62
France	4 4	to 4 5	18.40 to	18.62
Luxemburg	4 4	to 4 5	18.40 to	18.62
Billets (nominal):				
Belgium	6 0	to 6 5	26.28 to	27.38
France	6 0	to 6 5	26.28 to	27.38
Merchant bars:			C. per Lb.	
Belgium	7 0 and upward		1.37	
Luxemburg	7 0 and upward		1.37	
France	7 0 and upward		1.37	
Joists (beams):				
Belgium	6 10 and upward		1.27	
Luxemburg	6 10 and upward		1.27	
France	6 10 and upward		1.27	
Angles:				
Belgium	8 0	to 8 5	1.56 to	1.61
⅛-in. plates:				
Belgium	8 10 and upward		1.66	
Germany	8 10 and upward		1.66	
¾-in. plates:				
Luxemburg	8 10 and upward		1.66	
Belgium	8 10 and upward		1.66	

ditions, it is now necessary to reduce the cost of production; this may be rendered possible by the lowering of the cost of living, which is beginning to manifest itself.

Owing to the reappearance of British competition, whose cost of production is lower than ours, and the efforts displayed by the Ruhr industrials to gain, by means of large price concessions, their lost markets, business is almost impossible, the few transactions made bearing on relatively small tonnages. New difficulties are anticipated by the coming increase in the cost of transportation of merchandise over the Belgian railroads.

Following are quotations on the Antwerp market, but they are mostly nominal prices, as business is extremely rare:

	Fr.	
Chill cast iron No. 3..	420 to 440	($23.44 to $24.56)
Blooms	500	($27.91)
Billets	530	($29.58)
Beams and bars.....	650	(1.62c. per lb.)
Heavy sheets	800	(1.99c. per lb.)

Iron and steel production in the Grand Duchy during the month of March included the following items: *Pig iron:* Thomas iron, 182,918 tons; chill cast iron, 3380 tons; forge iron, 495 tons; total, 186,793 tons. *Steel:* Thomas steel, 152,778 tons; open-hearth, 2775 tons; electric steel, 488 tons; total, 156,041 tons.

Active furnaces in the Grand Duchy at end of March included 36, as follows:

Arbed: 6 at Esch sur Alz (out of 6), 6 at Dudelange (out of 6), 2 at Dommeldange (out of 3).

Terres Rouges: 6 at Belval (out of 6), Esch, out of work.

Hadir: 8 at Differdange (out of 10), Rumelange out of work.

Rodange: 5 out of 5.

Steinfort: 3 out of 3.

GERMAN PLANTS NEED CAPITAL

Labor Is Bettering Its Output and Is Reaching the Pre-War Per Capita Level—Employment Improving Rapidly

BERLIN, GERMANY, April 18.—The reparations settlement proposed by the Dawes committee is expected, if fully carried through, to foster greatly Germany's production of iron and steel. The settlement involves the economic evacuation of the Ruhr, without which local industry cannot return to normal conditions. The doubtful point at time of writing is whether France will consent to the immediate economic evacuation which General Dawes and his colleagues had in mind. If she does not consent Germany loses her chief inducement to accept the proposals.

Conditions here are improving. The rentenmark is still stable; the Gold Discount Bank, which is to operate in sterling until the creation of the definitive gold currency planned by the Dawes committee, is already in operation, backed by £15,000,000 of foreign capital and credits; the federal finance accounts continue approximately to balance. and the Government still can borrow 100,000,000 rentenmarks from the Rentenbank in case of need, only 200,000,000 rm. of the maximum 300,000,000 rm. non-interest bearing credit having been borrowed so far. The industrial recovery is verp rapid. The April 1 official report shows 712,000 unemployed in unoccupied territory against 978,000 on March 15, and over 1,500,000 at the beginning of the year.

Possible Over-Production of Steel

The iron and steel markets are active, but there are signs of a slight reaction, due to the buyers' belief that production will now continue to increase and that overproduction is possible. Already certain producers who recently refused orders are offering to deliver within six or eight weeks; and though prices, which recently have risen, are declared to be still below production cost, a new decline is possible.

At a meeting early this month of the former members of the Stahlbund it was reported that the works were in general satisfactorily employed, the exception being the Siegerland concerns, which were recovering very slowly. Demand for pig iron, bars and sheets was until lately very active, but new orders are coming in slowly. Railroad material is still hard to dispose of. The Federal Railroad Administration declares that its financial position does not permit giving big orders; the same is true as regards street railways and light railways of municipalities and private transport corporations. Foreign orders for locomotives are not being received.

Capital and Credits Needed

Shortage of working capital still hampers production and checks buying. Although the Reichsbank's papermark credits to industry have of late largely increased and although rentenmark credits to industry, given via the Reichsbank, increased last month from 400,000,000 to 800,000,000 rentenmarks, the money need continues acute. Private banks are charging 90 per cent a year on advances, and allowing 15 per cent on deposits, subject to two week's notice of withdrawal. The machine tool branch is dull. Orders from the Ruhr, from the Saxon industrial district and from South Germany have of late somewhat increased. Prices are low and a price struggle is proceeding between the manufacturers, organized in the Deutsche Spiralbohrer Verband, and outsiders, who are cutting prices severely.

Bar iron prices have risen to 160 marks per metric ton (1.73c. per lb.) ex works; ingots 125 ($30.25); thick sheets 170 (1.84c.); thin (under 1 mm.) 230 (2.49c.). These prices are approximate and vary slightly from day to day, there being no longer any price-fixing organization for the whole industry. The Pig Iron Syndicate, which still fixes prices without being able to enforce them, this week raised prices all around by between 3 and 60 marks a ton, leaving the rate for foundry pig No. 3 at 94 marks ($22.75). The high price of ore is complained of. Some smelters declare that, although orders in hand are abundant, they refrain from re-firing blown-out blast furnaces, owing to the fact that production must be carried on at a loss. The prices of scrap iron remain high, steel scrap being 87 to 89 gold marks ($21.05 to $21.54) a ton. Against these complaints is the fact that since the franc recovery French and Belgian prices are higher than German.

Labor Bettering Its Output

Per capita output, both in coal mining and iron and steel production, is increasing. Reports published by the Siemens (electrical) and Borsig (locomotive) concerns show that the average worker who is actually engaged in manual production has restored his efficiency approximately to pre-war level. The low per capita production appearing in some reports is due to calculating on the basis of whole staffs, whether manual, technical or clerical. Since the war the proportion of technical and clerical employees to manual workers has enormously increased and, with the above method of calculation, this increase necessarily reduces the apparent per capita output. As an instance: in 1913 the Borsig company employed 4561 persons, of whom 2740 (60 per cent) were "productive" or manual workers; in 1922 it employed 7245 persons, of whom only 3271 (45 per cent) were "productive."

No new fusions of first-rate importance, except in the automobile branch, are reported. The Hommel concern, which controls the Cologne-Ehrenfeld Tools Co., has linked up with Otto Wolff; and the Hannover Machine Construction Co. has united with the important Lothringen Mining Co. Five machine companies of second-rate importance have entered a combine under leadership of the Silex-Union United Machinery Works.

In automobile construction, the leading Daimler and Benz concerns have combined. Both companies have affiliations in their own and other branches. The main aim is to standardize and to distribute the production of stadardized parts, with the aim of resisting American competition after the abolition of the present import prohibition on automobiles. The small output of German companies, none of which produces more than 4000 cars a year, keeps up production cost and hampers

technical progress; and in their campaign against the expected "Ford invasion," trade journals openly declare that German cars are falling behind, not so much in quality of work as in the matter of useful innovations. A fusion of all the leading automobile companies is mooted.

COMPETITION RULES MARKET

Belgian, German, Luxemburg and British Quotations Below French—Further Lowering of Prices Indicated

PARIS, April 25.—Now that the Ruhr agreements are renewed for two months, as a prelude to a definite settlement, and the plants are assured of having sufficient supplies of coke there is a general belief that we are going toward a moderate decline, owing to higher costs. The increase in output, facilitated by the arrivals of coke, will, if important enough, lower the cost of production; on the other hand, the lack of new orders will enlarge the competition between the sellers and lead to price concessions.

The Minister of Finance declared that, exchange having ceased to be unfavorable, the recovery of the franc should be pursued slowly and progressively, so as not to disturb the market again. Let us accept this augury and hope that the element of uncertainty long prevailing here will soon disappear; but unfortunately, the market is again in the hands of speculators.

Lower prices are already noticed in some departments and further decline is expected in May. In Brussels, since the recovery of the franc, the market has been featureless. A few orders were taken for spot delivery at prices nearing those of the world market. In Antwerp, the Germans are beginning to take orders again at prices that we cannot possibly meet.

Coke.—For the first 16 days of April, the ORCA has been supplied with 429,186 tons of coke, or about 19,500 tons per day. The price of coke for April will be 150.75 fr. ($9.66) all charges included; 0.50 fr. per ton for the general expenses of the ORCA and 5 fr. per ton mutual insurance funds, as reported in our last letter.

Pig Iron.—With enough coke on hand, production will be pushed. Prices are still on the average of 400 fr. per ton ($25.64) for May, but some plants, not so well supplied with orders, accept lower rates. Homécourt, in the East, is dealing now at 398 fr. per ton ($25.51); even 375 to 380 fr. ($24.04 to $24.36) is recorded for June. On domestic and export markets British irons are sold at about the same rates as ours. The Belgians ask 420 to 440 fr. for the No. 3 P. L., or 368 fr. ($23.60) of our currency. The competition with British hematite is still keener, and our prices consequently stand at 450 to 475 fr. per ton ($28.84 to $30.45) at mills, according to qualities and tonnages, and 450 to 460 fr. ($28.84 to $29.48) for June.

Semi-Finished Products.—In Thomas steel, prices are now more accessible while steel is anything but plentiful. Ingots are worth 49 to 50 fr. per 100 kilos ($31.40 to $32.05) at mills; blooms, 51 to 52 fr. ($32.69 to $33.33); billets, 52.50 to 53.50 fr. ($33.65 to $34.29). In open-hearth, prices range 4 fr. ($2.52) higher.

Rolled Steel.—This department is, as usual, the most affected by the decline, and competition is most active. The plants are also keen competitors for beams, in spite of the favorable prospects in building sections for the Paris area. Delivery times range from six to eight weeks and ruling quotations 59 to 62 fr. (1.69c. to 1.77c. per lb.). As for small and medium samples, orders are still placed with difficulty, some of the plants asking three or four months to deliver. Last week, the average basis was 61 to 64 fr. per 100 kilos (1.75c. to 1.83c. per lb.), but it is generally believed the price of 60 fr. (1.72c.) will soon be reached. The lowest quotations accepted by a Belgian firm were 625 fr. per ton (or 535 fr. of our currency) (1.53c. per lb.) and by a Luxemburg firm £7 2s. 6d. (1.41c. per lb.) for beams and £7 5s. (1.43c.) for bars; or prices currently accepted by the Germans, and even £7 (1.38c.) and lower. Business, in such conditions, appears unfeasible.

Wire Products.—This section is calm with prices ranging from 75 to 78 fr. per 100 kilos (2.15c. to 2.23c. per lb.) for spot delivery. The Belgian plants have lowered their prices more than we did, but with no more success.

Sheets.—This department is perhaps the most stable of all the market, heavy grades excepted, however. We note keen foreign competition. It must be remembered that we are great importers of sheets, in spite of a noticeable increase in our production. Belgian and British plants are making offers; the latter offered some navy sheets at 750 fr. (2.15c. per lb.) delivered, while some of the leading Lorraine plants quote 780 fr. (2.23c.) at mills. In this section, the following are recorded: large flats, 68 to 72 fr. (1.95c to 2.06c.); 5 mm. and up, 71 to 75 fr. (2.03c to 2.15c.); 3 mm. and up, 80 to 90 fr. (2.29c. to 2.58c.); light gages, 98 to 105 fr. (2.80c. to 3c.). The Germans are taking orders f.o.b. Antwerp at £8 (5 mm. and up) (1.58c. per lb.); and £8 17s. 6d. (3 mm.) (1.74c. per lb.).

OTTO WOLFF SUCCEEDS STINNES

As Industrial Organizer and Fusionist, Wolff Appears to Be Logical Business Leader in Germany

BERLIN, GERMANY, April 18.—The death of Herr Stinnes is not expected to affect materially the internal organization of the heavy metal industries. The Stinnes fusion process in iron, steel and coal companies already showed signs of coming to an end. After the Ruhr occupation Stinnes was engaged on plans for separating those concerns of his "Electro-Mining Combine" which lay in occupied territory from those in unoccupied. His recent fusion activities were in other branches. The separation, which was planned also by other big heavy industry combines, will not be necessary if the "economic evacuation" takes place. Stinnes' older and somewhat solider partner, Emil Kirdorf, founder of the Rhenish-Westphalian Coal Syndicate, remains in charge.

As a personality in big industry Stinnes' natural successor seems to be Otto Wolff of Cologne, who first gained international notoriety by his fight against English tin plate interests, later by his monopolistic agreement, since repudiated, with Soviet Russia. Wolff's big and ever-growing fusion differs in origin from those of Stinnes and the other Ruhr magnates. In all these fusions, a producing corporation (in Stinnes' case the Deutsch-Luxemburg Co.) led; but Wolff began as an iron and steel dealer, as founder of the Otto Wolff Eisenhandel (Iron Trading Co.) A. G. of Cologne, his partner being Ottmar Strauss.

Wolff's Activities

Even during the war Wolff forced into his sphere big producing concerns, of which the chief were the Phoenix A. G. which, through its connections with the Reiherstieg Shipyard, the Sachsenwerk Electrical Co. of Chemnitz, and an important motor works, spread its interests to the Rhenish Steelworks of Duisburg-Meiderich, which had extensive ramifications in allied industrial branches. Another allied producer is the Van der Zypen Steelworks. The Phœnix remains Wolff's chief producing member, because through it he is in touch with the Haniel concern and the General Electricity Co. (A. E. G.), while through the Rhenish Metal Co. he is allied to Krupps. Altogether Wolff controls or works with 8 trading concerns, 7 raw material producing concerns, 12 concerns producing semi-finished materials and 14 producers of finished goods, including, in addition to ships and electro-technical wares, machine tools and automobiles. Finally, Wolff is connected with the vast Kloeckner and Thyssen concerns via the Van der Zypen Co., being represented by the same persons on the control boards of all three.

TO REDUCE SHEET SIZES

Simplification Plans to Be Considered at White Sulphur Springs Meeting

WASHINGTON, May 6.—When executives of companies making tin plate and sheet steel meet on May 14 in White Sulphur Springs, Va., a part of the program will be devoted to a study of simplification of varieties of sheet steel with a view to eliminating a number of unusual sizes and varieties, it was announced today by the Division of Simplified Practice, Department of Commerce.

For what is believed to be the first time in the history of the industry, there have been gathered complete statistics from 27 companies engaged in the manufacture of sheet steel. This action is a sequel to meetings of the metal branch of the National Hardware Association and of the National Association of Sheet and Tin Plate Manufacturers last year. At both meetings it was urged that such a study be made.

A committee was appointed, headed by W. C. Carroll, vice-president, Inland Steel Co., Chicago, and a survey was begun in January covering complete shipments to jobbers for the last six months of 1922 and embracing gage of material, size of plates and tonnage shipped. The collection of the reports was undertaken by W. S. Horner and Walter W. Lower, president and secretary, respectively, of the National Association of Sheet and Tin Plate Manufacturers, and after the figures had been consolidated, the report was supplied to the Division of Simplified Practice.

The results of this report will be presented to the executives by A. E. Foote of the Division of Simplified Practice, who has cooperated with the interested companies in developing the needs for elimination of wasteful excess varieties in the industry.

Similar committees have been appointed to make surveys of terne plates, and eaves trough and conductor pipe. N. H. Taylor, N. & G. Taylor Co., Philadelphia, is chairman of the committee on terne plates; and A. Q. Moffatt, Wheeling Corrugating Co., Wheeling, W. Va., is the chairman of the committee on eaves trough and conductor pipes.

The reports of these committees and figures developed during their surveys will be made in the near future, it is indicated. On the basis of such reports will rest the decisions as to recommendations for elimination of excess items in these commodities.

JAPANESE RAILROADS BUY

Purchases of Car Couplers—South Manchuria Buys Shapes—Tin Plate Buyers Await Lower Market

NEW YORK, May 6.—While Japanese merchant buying is extremely light, inquiries and purchases by railroads and large companies are fairly active. The depreciated exchange has apparently been the chief factor in preventing large purchases, but the condition of the American market is being watched closely by Japanese buyers, who seem to expect further price recessions. Prospective purchasers of black sheets and tin plate note the easier conditions in the tin plate market and as a result evidently are delaying purchases as long as possible. Recent activity has been largely by railroads.

In Chinese trade continued improvement is reported, although offering prices of Chinese merchants are still too low to permit business in many instances. Wire shorts are reported moving in fair volume, merchants offering to pay $59 to $60 per ton, c.i.f. China, depending upon assortment. Offers on second-hand plates are too low as a rule to interest holders in the United States. A few purchases of wrought iron pipe are reported and there have been further inquiries for tin plate wasters.

In Japan, among the large buyers of material, recently active, is the Imperial Government Railways. An order for car couplers was divided between Okura & Co., New York, and Suzuki & Co., New York, the former receiving 10,000 pairs and the latter 5000 pairs of couplers. Another railroad purchasing couplers is the Aichi Electric Railway, which awarded 420 to Takata & Co. and 40 to Mitsui & Co., New York. It is expected that the South Manchuria Railway Co. will be in the market shortly for a fairly large tonnage of car couplers. Of the 92,000 ft. of gas pipe recently inquired for by the Imperial Government Railways, about 11,000 ft. was awarded to Mitsui & Co. and placed with an independent maker. The award of pipe to an independent is considered noteworthy, as a large proportion of Japanese buyers as a rule seem to show a preference for the leading interest. Another award of the Government railroads, but not placed with American makers, is the 400 tons of plain galvanized wire and 350 tons of telegraph wire, all of which is stated to have gone to a Japanese wire mill, the Inui Telegraph Wire Co., with a plant near Osaka. The price on both lots is said to have been about $24 per ton less than the quotation of American sellers, the plain wire having gone at about $74 per ton.

The South Manchuria Railway Co. is said to have been the purchaser of about 750 tons of light shapes for use in car building. Recent quotations on structural material have shown considerable concessions and this business is said to have resulted in a price of slightly better than $55 per ton, c.i.f. Dairen, Manchuria. Although it is claimed that further concessions on light gage black sheets have been made by some independent mills, little or no business seems to have resulted.

Electric Brass Melting in Last Two Years

The trend of developments in electric brass furnace practice in the last two years is discussed by Dr. H. W. Gillett, head of the department of metallurgy, Bureau of Standards, and E. L. Mack, in a publication of the Bureau of Mines, just issued, entitled "Present Tendencies in Electric Brass Furnace Practice." It is designated as serial No. 2597 and supplements bulletin 202, published in 1922. The report goes into the details of the various installations of different types of furnaces in this industry and concludes with the following summary:

The present situation in the electric brass furnace industry is that there are two types of furnaces in use, the induction and the rocking, or indirect-arc, furnace, typified by the Ajax and the Detroit furnaces. These have found increasing favor in the last two years, while other types have not made appreciable advances. There are about 540 active electric furnaces doing commercial, non-ferrous melting in the United States, using something over 60,000 kw. Of these about 275 are induction furnaces, credited with about 16,000 kw.; about 135 are moving, indirect-arc furnaces with about 28,000 kw. and 80 are old type Baily furnaces with about 7500 kw. The remaining 50 furnaces of various types account for the consumption of the other 8500 kw. The popularity of the two chief types has been obtained because both are efficient, both give lower metal losses than do fuel-fired furnaces, and both store the metals so as to give perfect mixing.

The report also states that the induction type is more or less standard for 24-hr. operation in the rolling mill on yellow brass, and the rocking arc type is more or less standard for red brass and for general foundry work. Unless the problem of a satisfactory lining for the induction furnace on red brass is solved, the field will probably continue to be divided in that fashion. The last two years have produced no startling new development in this field. The possibilities and limitations of the electric brass furnace are becoming better understood. The increase in the number of furnaces installed indicates that the growth is likely to continue and that the electric furnace is of decided use in the non-ferrous metal industry.

The report also gives a list of some 17 patents that might be of interest in this field.

APRIL IRON OUTPUT

Decrease from March Was 4028 Tons Per Day

Net Loss of 40 Furnaces, with 44 Shut Down and 4 Blown In

A sharp curtailment in the production rate of pig iron was recorded in April. With a net loss of 40 furnaces the increase, which was registered in the first quarter by the net gain of 39 furnaces, was wiped out. The decrease does not show fully in the total output for April because many of the furnaces were shut down late in the month. The industry is virtually back to the status which prevailed on Jan. 1. Not in many months have so many furnaces gone out in one month.

Production of coke and anthracite pig iron for the 30 days of April amounted to 3,233,428 gross tons, or 107,781 tons per day, as compared with 3,466,086 tons, or 111,809 tons per day, for the 31 days in March, according to revised data. This is a loss of 4028 tons per day in April as compared with a gain of 5783 tons per day in March. There were 44 furnaces blown out or banked in April, with only 4 blown in, or a net loss of 40. Of the 44 shut down 35 were steel making and 9 were merchant furnaces, the Steel Corporation being credited with 14. Two merchant and 2 steel-making furnaces were blown in.

The capacity of the 230 furnaces in blast on May 1 is estimated at 96,365 tons per day, as compared with an estimated capacity of 112,240 tons per day for the 270 furnaces in blast April 1.

Ferromanganese output in April was the largest this year at 23,580 tons, with the spiegeleisen production the smallest at 4240 tons.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from April, 1923, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
April, 1923	90,145	28,179	118,324
May	96,029	28,735	124,764
June	90,907	31,641	122,548
July	88,798	29,858	118,656
August	86,479	24,795	111,274
September	78,799	25,385	104,184
October	77,255	24,331	101,586
November	72,352	24,124	96,476
December	69,921	24,304	94,225
January, 1924	73,368	24,016	97,384
February	83,126	22,900	106,026
March	86,276	25,533	111,809
April	82,101	25,680	107,781

The figures for daily average production, beginning with January, 1918, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1918—Gross Tons

	1918	1919	1920	1921	1922	1923	1924
Jan.	77,799	106,525	97,264	77,945	53,063	104,181	97,384
Feb.	82,835	105,006	102,720	69,187	58,214	106,935	106,026
Mar.	103,648	99,685	108,900	51,468	65,675	113,673	111,809
Apr.	109,607	82,607	91,327	39,768	69,070	118,324	107,781
May	111,175	68,002	96,312	39,394	74,409	124,764	.....
June	110,793	70,495	101,451	35,494	78,701	122,548	.....
July	110,354	78,340	98,931	27,889	77,592	118,656	.....
Aug.	109,341	88,496	101,529	30,780	58,586	111,274	.....
Sept.	113,942	82,932	104,310	32,850	67,791	104,184	.....
Oct.	112,482	60,115	106,212	40,215	85,092	101,586	.....
Nov.	111,802	79,745	97,830	47,183	94,990	96,476	.....
Dec.	110,762	84,944	87,222	53,196	99,577	94,225	.....
Year	105,496	83,789	99,492	45,325	73,645	109,713	.....

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the foregoing totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total Production		Spiegeleisen and Ferromanganese			
			1923		1924	
	1923	1924	Fe-Mn	Spiegel	Fe-Mn	Spiegel
Jan.	2,479,727	2,274,005	19,358	12,056	20,735	7,948
Feb.	2,259,154	2,410,658	21,282	3,657	22,405	9,870
Mar.	2,724,305	2,674,565	20,730	13,832	22,351	13,796
Apr.	2,704,360	2,463,027	20,808	7,440	23,580	4,240
May	2,976,892	.....	19,568	9,533	.....	.....
June	2,727,208	.....	19,717	18,289	.....	.....
½ year	15,871,646	.....	121,564	64,807	.....	.....
July	2,752,738	.....	26,493	12,876	.....	.....
Aug.	2,680,851	.....	22,045	5,586	.....	.....
Sept.	2,363,967	.....	23,206	4,478	.....	.....
Oct.	2,394,922	.....	20,015	15,931	.....	.....
Nov.	2,170,567	.....	14,839	16,783	.....	.....
Dec.	2,167,563	.....	18,069	10,124	.....	.....
Year	30,402,254	.....	246,231	130,585	.....	.....

Capacities in Blast May 1

The following table shows the number of furnaces in blast May 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast April 1.

Coke and Anthracite Furnaces in Blast

Location of Furnaces	Total Stacks	May 1 In Blast	May 1 Capacity per Day	April 1 In Blast	April 1 Capacity per Day
New York:					
Buffalo	22	12	4,700	18	6,830
Other New York	5	1	300	2	690
New Jersey	4	0	....	1	420
Pennsylvania:					
Lehigh Valley	12	6	2,265	8	2,915
Spiegel	2	1	140	2	240
Schuylkill Valley	15	6	2,000	6	1,980
Lower Susquehanna	9	4	1,205	5	1,680
Ferromanganese	1	1	65	1	70
Lebanon Valley	5	1	190	3	405
Ferromanganese	1	2	115	1	70
Pittsburgh District	55	43	19,000	50	23,000
Ferro and spiegel	4	2	440	4	650
Shenango Valley	17	10	4,400	11	4,500
Western Pa.	22	11	3,480	14	5,130
Ferro and spiegel	2	..	....	..	....
Maryland	5	3	1,415	5	2,115
Ferromanganese	1	1	100	1	70
Wheeling District	14	11	4,600	12	5,120
Ohio:					
Mahoning Valley	28	18	10,200	24	11,745
Central and Northern	25	20	10,290	20	10,030
Southern	14	6	1,695	6	1,805
Illinois and Ind	42	31	17,000	37	20,495
Mich., Wis. and Minn.	12	7	2,910	6	2,600
Colorado and Missouri	6	4	1,315	3	1,145
The South:					
Virginia	18	2	230	3	330
Kentucky	7	1	320	1	345
Alabama	39	23	7,620	23	7,410
Ferromanganese	1	1	65	1	70
Tenn., Ga. and Texas	15	2	575	2	380
Total	403	230	96,635	270	112,240

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for April and the three months preceding.

Pig Iron Production by Districts, Gross Tons

	April (30 days)	March (31 days)	Feb. (29 days)	Jan. (31 days)
New York	203,920	242,003	214,909	211,572
New Jersey	12,545	13,006	13,730	18,038
Lehigh Valley	83,969	97,817	87,583	91,863
Schuylkill Valley	64,558	61,346	59,020	67,757
Lower Susquehanna and Lebanon Valleys	63,448	68,863	60,478	63,789
Pittsburgh district	657,479	716,106	638,462	609,500
Shenango Valley	131,987	134,925	106,377	106,316
Western Pa.	138,455	158,142	145,984	124,503
Maryland, Virginia and Kentucky	77,247	88,631	67,733	60,235
Wheeling district	152,843	158,825	136,719	145,214
Mahoning Valley	326,091	373,410	330,420	326,629
Central and Northern Ohio	308,615	294,624	270,207	265,471
Southern Ohio	50,874	56,001	47,824	43,902
Illinois and Indiana	586,722	629,381	541,649	525,975
Mich., Minn., Mo., Wis. and Colo.	126,765	127,788	125,227	126,879
Alabama	230,548	231,817	219,358	225,556
Tennessee	17,362	11,801	9,077	5,691
Total	3,233,428	3,466,086	3,074,757	3,018,890

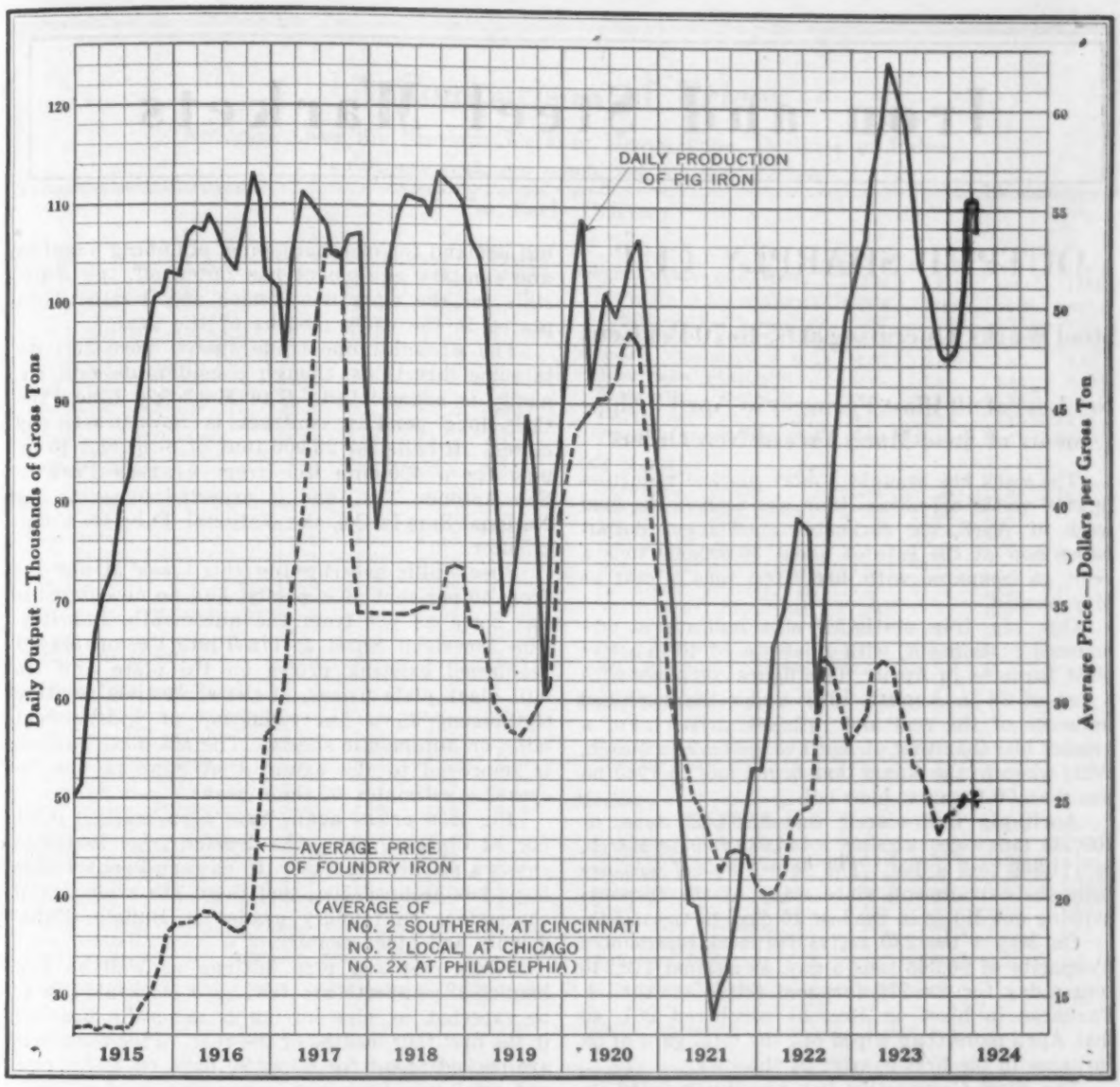

Diagram of Pig Iron Production and Price

Production and Price Chart

The fluctuations in pig iron production from 1915 to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of the daily average production, by months, of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1920—Gross Tons

	1920	1921	1922	1923	1924
Jan.	3,015,181	2,416,292	1,644,951	3,229,604	3,018,890
Feb.	2,978,879	1,937,257	1,629,991	2,994,187	3,074,757
Mar.	3,375,907	1,595,522	2,035,920	3,523,868	3,466,086
Apr.	2,739,797	1,193,041	2,072,114	3,549,736	3,233,428
May	2,985,682	1,221,221	2,306,679	3,867,694	.....
June	3,043,540	1,064,833	2,361,028	3,676,445	.....
½ year.	18,138,986	9,428,166	12,050,683	20,841,534	.....
July	3,067,043	864,555	2,405,365	3,678,334	.....
Aug.	3,147,402	954,193	1,816,170	3,449,493	.....
Sept.	3,129,323	985,529	2,033,720	3,125,512	.....
Oct.	3,292,597	1,246,676	2,637,844	3,149,158	.....
Nov.	2,934,908	1,415,481	2,849,703	2,894,295	.....
Dec.	2,703,855	1,649,086	3,086,898	2,920,982	.....
Year*	36,414,114	16,543,686	26,880,383	40,059,308	.....

*These totals do not include charcoal pig iron. The 1923 production of this iron was 251,177 tons.

Among the furnaces blown in during April were the following: The Keystone furnace in the Schuylkill Valley; No. 1 Duquesne furnace in the Pittsburgh district; one Detroit furnace in Michigan and the furnace of the Mississippi Valley Iron Co. in Missouri, temporarily leased by the St. Louis Coke & Chemical Co.

Among the furnaces blown out or banked during April were the following:

Furnaces C, D, G and J of the Lackawanna plant of the Bethlehem Steel Co., the Niagara furnace of the American Radiator Co., and No. 1 furnace of the Donner Steel Co. in the Buffalo district; the Northern furnace at Port Henry, N. Y.; A furnace at Wharton, N. J., of the Replogle Steel Co.; C and F furnaces of the Bethlehem plant of the Bethlehem Steel Co. and one furnace of the New Jersey Zinc Co. in the Lehigh Valley; the Temple furnace in the Schuylkill Valley; No. 3 furnace at the Steelton plant of the Bethlehem Steel Co. in the Lower Susquehanna Valley, and one Lebanon furnace of the same company in the Lebanon Valley; one Shoenberger furnace of the American Steel & Wire Co., No. 1 Clairton, No. 2 Duquesne, Edgar Thomson C furnace, No. 1 Isabella and No. 1 Lucy of the Carnegie Steel Co., two Eliza furnaces and the Soho furnace of the Jones & Laughlin Steel Corporation, and No. 1 Monongahela furnace of the National Tube Co. in the Pittsburgh district; No. 2 Farrell furnace of the Carnegie Steel Co. in the Shenango Valley; K furnace of the Johnstown plant of the Bethlehem Steel Co. and the two Josephine furnaces in western Pennsylvania; the Oriskany furnace in Virginia; B and C furnaces of the Maryland plant of the Bethlehem Steel Co. in Maryland; No. 1 Bellaire furnace of the Carnegie Steel Co. in the Wheeling district; two East Youngstown and the Tod furnace of the Youngstown Sheet & Tube Co., No. 4 Ohio furnace of the Carnegie Steel Co. and the Mattie and Anna furnaces in the Mahoning Valley; No. 1 Joliet, Nos. 2 and 3 South Chicago (new) and No. 9 South Chicago (old) of the Illinois Steel Co. in the Chicago district, as well as the stack of the St. Louis Coke & Chemical Co. at Granite City, Ill.

Iron and Steel Markets

OUTPUT SHARPLY CUT

Steel Works Operating at 65 to 70 Per Cent

Net Loss of 40 Blast Furnaces in April—Shipments of Steel Much Exceed New Orders

The week has brought a more marked reduction in steel works operations than was seen in the final week of April, the estimated steel ingot output being now at the rate of about 36,000,000 tons a year, as compared with 40,000,000 tons a year as May opened.

Our pig iron statistics also indicate a pronounced curtailment, with a net loss of 40 in active blast furnaces in April. This figure compares with a loss of 28 in August, 1922, under the combined influence of the coal and railroad strikes. For a greater loss than that of April we go back to March, 1921, when in the slump that began late in 1920 no less than 50 furnaces blew out.

April pig iron output was 3,233,428 tons, or 107,781 tons a day, against 3,446,086 tons in March, or 111,809 tons a day. The figures do not measure fully the curtailment, since many of the furnaces blowing out did so in the last 10 days of the month.

On May 1 the 230 active furnaces represented a capacity of 96,365 tons a day, as against 112,240 tons a day for the 270 furnaces active on April 1. Furnaces in blast on Dec. 31 numbered 231, so that April more than wiped out the total gain of 39 furnaces in the first quarter of the year.

The Steel Corporation has recently reduced its steel output relatively more than its pig iron output. In the first three months of the year it accumulated semi-finished steel, and is now using up these stocks. Its steel production is now at 73 per cent of capacity, whereas the industry as a whole is at 65 to 70 per cent.

With all steel companies new business is less than current shipments, in some cases as much as 50 per cent less. But as consumption is plainly of much greater volume than are new orders, the steel companies have a basis for the expectation that the latter will increase. In fact, some producers have had better bookings in the past week than in the last week of April.

Finished steel prices have not been severely tested, as few attractive tonnages have come up. With demand so light, mills are not tempted to cut deeply; on the other hand, buyers find no signs of price stabilization. Thus a drifting market is not unlikely for some weeks.

Various manufacturing consumers of steel have reduced operations, Chicago reporting a number of metal-working plants running four or five days a week, as against full time in the first quarter.

Structural steel bookings of the week totaled barely 19,000 tons, or one-third under the weekly average so far this year. Fresh inquiries were not over 12,000 tons, less than one-half the tonnage of recent weeks. Hesitation is apparent chiefly in investment enterprises.

Residential construction is still in full swing, but demand for merchant pipe, plumbing supplies and sanitary equipment has fallen off, the materials for the work now under way having been placed in the early months of the year.

The wrought pipe trade shows more activity in some directions, though considerable mill capacity is unemployed. The McCorkle Line Pipe Co.'s long pending contract is now practically closed. It calls for 25,000 tons of 8-in. and 10-in. pipe for a 400-mile line from Aransas Pass to San Antonio, Tex., and is expected to go to the National Supply Co., the National Tube Co.'s distributer.

Sheet mills are running this week at not far from 50 per cent of capacity, and no new impetus has come as yet from the automobile industry. The American Sheet & Tin Plate Co. on May 1 reaffirmed existing prices on tin plate and tin mill black plate prices, at the same time meeting the recent $5 a ton reduction of independent mills on automobile sheets. The tin plate outlook is improved to the extent that canners are increasing estimates of their needs.

Pig iron prices again have been marked down 50c. at Chicago, where the demand from foundries shows a marked decrease. In eastern Pennsylvania basic has declined 50c., and there are evidences of concessions on foundry grades at Buffalo, Philadelphia and other centers.

While cast-iron pipe lettings as well as new municipal prospects are few, such slackening is to be expected, as pipe buying is generally heaviest in the first four months of the year. Pipe foundries are booked ahead for 60 to 90 days on 12-in. pipe and smaller and are not in pressing need of business. Prices are somewhat easier.

Consumers of Lake Superior ore show little interest in the market and few sales have been made since the 80-cent reduction in prices. Similar conditions prevail as to Eastern ores, but a few sales are reported at figures lower than the delivered prices of Lake or foreign ores.

Pittsburgh

Production Declining More Rapidly—No Gain in Orders

PITTSBURGH, May 6.—Adjustment of production of iron and steel to the lower rate of demand continues in this district, and at a greatly accelerated pace. Suspension of seven additional blast furnaces has taken place since a week ago, while orders have been issued for the blowing out of three others and two other furnaces are about ready to cease production, having ordered coke shipments stopped. These suspensions will reduce the number of blast furnaces in production in this and nearby districts to 83 out of a total of 139, and represent a decrease of 31 stacks as compared with the recent peak. The Carnegie Steel Co. now is operating 40 of its 58 furnaces and has ordered three other furnaces on to the inactive list. A little over a month ago this company had 50 furnaces in production. Ingot

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	May 6, 1924	April 29, 1924	April 8, 1924	May 8, 1923
No. 2X, Philadelphia‡	$22.76	$22.76	$23.26	$32.76
No. 2, Valley Furnace†	21.00	21.00	22.00	31.00
No. 2, Southern, Cin'ti†	26.05	26.05	26.55	31.05
No. 2, Birmingham, Ala.†	22.00	22.00	22.50	27.00
No. 2 foundry, Chicago*	*23.00*	23.50	24.50	32.00
Basic, del'd, eastern Pa	*21.00*	21.50	21.50	30.25
Basic, Valley furnace	21.00	21.00	21.75	31.00
Valley Bessemer del. P'gh.	24.26	24.26	24.76	32.77
Malleable, Chicago*	*23.00*	23.50	24.50	32.00
Malleable, Valley	21.50	21.50	22.50	31.00
Gray forge, Pittsburgh	22.26	22.26	23.76	32.27
L. S. charcoal, Chicago	29.15	29.15	29.15	36.65
Ferromanganese, furnace	107.50	107.50	107.50	130.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	45.00
O.-h. billets, Pittsburgh	40.00	40.00	40.00	45.00
O.-h. sheet bars, P'gh	41.00	41.00	42.50	45.00
Forging billets, base, P'gh.	45.00	45.00	45.00	55.00
O.-h. billets, Phila	43.17	43.17	45.17	50.17
Wire rods, Pittsburgh	51.00	51.00	51.00	51.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.25	2.25	2.30	2.50
Light rails at mill	2.00	2.00	2.00	2.25

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.52	2.52	2.52	2.825
Iron bars, Chicago	2.30	2.30	2.35	2.60
Steel bars, Pittsburgh	2.25	2.25	2.30	2.40
Steel bars, Chicago	2.35	2.35	2.40	2.69
Steel bars, New York	2.59	2.59	2.64	2.74
Tank plates, Pittsburgh	2.20	2.20	2.30	2.50
Tank plates, Chicago	2.45	2.45	2.50	2.84
Tank plates, New York	2.49	2.54	2.54	2.84
Beams, Pittsburgh	2.25	2.25	2.30	2.50
Beams, Chicago	2.45	2.45	2.50	2.84
Beams, New York	2.59	2.59	2.59	2.84
Steel hoops, Pittsburgh	2.75	2.75	2.90	3.30

Sheets, Nails and Wire,	May 6, 1924	April 29, 1924	April 8, 1924	May 8, 1923
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.60	3.60	3.75	3.85
Sheets, galv., No. 28, P'gh.	*4.80*	4.85	4.90	5.25
Sheets, blue an'l'd, 9 & 10	*2.80*	2.85	2.85	3.25
Wire nails, Pittsburgh	3.00	3.00	3.00	3.00
Plain wire, Pittsburgh	2.75	2.75	2.75	2.75
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.80
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$6.00

Old Material, Per Gross Ton:				
Carwheels, Chicago	$16.00	$16.00	$17.00	$26.00
Carwheels, Philadelphia	17.00	17.00	17.50	25.00
Heavy steel scrap, P'gh.	15.50	15.50	17.00	23.50
Heavy steel scrap, Phila.	15.00	15.00	15.50	20.00
Heavy steel scrap, Ch'go	13.50	13.50	14.50	20.00
No. 1 cast, Pittsburgh	18.00	18.00	19.00	27.00
No. 1 cast, Philadelphia	17.00	17.00	18.00	25.00
No. 1 cast, Ch'go (net ton)	*17.50*	18.00	18.50	24.00
No. 1 RR. wrot. Phila.	17.00	17.00	18.50	25.00
No. 1 RR. wrot. Ch'go (net)	*12.00*	12.25	13.00	18.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$3.25*	$3.75	$3.75	$5.00
Foundry coke, prompt	4.75	4.75	4.75	6.00

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*13.50*	13.62½	13.75	16.75
Electrolytic copper, refinery	13.12½	13.12½	13.25	16.25
Zinc, St. Louis	*5.82½*	6.00	6.30	7.07½
Zinc, New York	*6.17½*	6.35	6.65	7.42½
Lead, St. Louis	7.50	7.50	8.25	7.20
Lead, New York	*7.75*	7.87½	8.50	7.50
Tin (Straits), New York	*47.50*	48.25	51.00	43.62½
Antimony (Asiatic), N. Y.	*8.75*	9.00	10.25	7.62½

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, May 6, 1924, Finished Steel, 2.653c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

April 29, 1924,	2.653c.
April 8, 1924,	2.703c.
May 8, 1923,	2.789c.
10-year pre-war average,	1.689c.

Composite Price, May 6, 1924, Pig Iron, $21.79 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

April 29, 1924,	$21.88
April 8, 1924,	22.59
May 8, 1923,	30.79
10-year pre-war average,	15.72

production also has been declining at a rapid rate and including the Carnegie Steel Co., which is operating at about 70 per cent of ingot capacity, the general average for the district is between 60 and 65 per cent of capacity. This represents a recession of about 30 per cent from the March high point.

The week has brought no appreciable gain in business in either iron or steel, apparently because buyers still believe that lower prices are ahead and nothing has happened so far as the producers are concerned to change that idea. Competition for orders for plates, shapes and bars, particularly those of inter-district classification, remains pretty keen. Within the area where Pittsburgh mills have the freight advantage over outside mills, the effort is being made to maintain 2.25c. base on plates, shapes and bars, but sales at this price on the boundaries of this area are extremely difficult. The market still is favorable to buyers on sheets, but evidently this condition is not stimulating to demand, since the sheet industry this week is operating only about 50 per cent of capacity. Incidentally, this makes the demand of the union sheet mill workmen for greatly increased wages somewhat inopportune, since a demand sufficient to keep only half of the mills engaged could easily be supplied by the non-union mills. The present situation in sheets finds its principal explanation in the low rate of automobile production, as the percentage of production going to that use was very high over the first quarter of the year. It is reported from Detroit that retail sales for automobiles have been helped by improved weather conditions, but this has not yet found reflection in the production schedules of manufacturers or in the demand for automobile steels.

Blast furnace suspensions have been so frequent recently that producers of coke have not been able to curtail production fast enough and the result is that a considerable tonnage is pressed upon the market and is available as low as $3.25 per net ton at ovens, as against $3.75, the recent prevailing prices.

The scrap market has lapsed back into dullness because the price ideas of sellers were above those of

the mills which were disposed to buy in an effort to reduce their cost averages. Not much scrap is pressed for sale, however, and the market seems to be dragging bottom.

Pig Iron.—Despite the steep decline in production, supplies still are ample for all requirements and prices are easy. Demand is still very limited, and the largest individual sale made during the week was 800 tons of basic iron of somewhat difficult analysis at $21 Valley furnace. It develops that the recent sale of this grade for shipment to Cumberland, Md., amounted to 2000 tons at a delivered price of $22 or $20 base, at the furnace. Only small individual lots on foundry and Bessemer iron have been sold and these have been at the prices of a week ago. W. P. Snyder & Co. make the average price of Bessemer iron shipped from Valley furnaces in April $22.80, against $23.38 in March and the April basic average price $21.50, against $22 in March. THE IRON AGE April averages were $22.80 for Bessemer at Valley furnace and for basic.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$21.00
Bessemer	22.50
Gray forge	$20.50 to 21.00
No. 2 foundry	21.00 to 21.50
No. 3 foundry	20.50 to 21.00
Malleable	21.50 to 22.00
Low phosphorus, copper free	29.00

Ferroalloys.—Trading still reflects a complete lack of interest in supplies upon the part of consumers, most of whom are covered by contracts, and since they see ahead a period of slackening plant operations, naturally are slow about closing for future requirements. There are reports that less than $107.50, seaboard, has been done on ferromanganese, but details as to whether it was domestic or British, or was direct or resale business are lacking. Representatives of producers disclaim lower prices. Prices generally are nominal. They are given on page 1395.

Semi-Finished Steel.—The market appears to be wavering, but there is so little business that it is impossible to designate lower prices. Sheet, tin plate and strip makers depending on outside sources of supplies for steel are not pressed with business; indeed, the reverse is true with sheet and strip makers. This makes for restricted specifications against contracts and some accumulation of supplies by billet, slab and sheet bar makers, who, no doubt, would be willing to make it interesting in the way of prices to buyers who might be in position to take some of the piled material. We continue recent prices, but they are untested and consequently nominal. With plates available as low as 2.20c. base, it is probable that less than the nominal quotation of 2.25c. would be accepted on skelp. Wire rods also are nominal at $51 base, and probably would be shaded if there was an inquiry for a fair-sized tonnage. It is doubtful whether a concession of $1 a ton on rods would interest any user in view of the limited and rather unsatisfactory market in the products of rods. Ingot production in this and nearby districts has further declined since a week ago and the average now is probably nearer 60 than 65 per cent of capacity, as against about 90 per cent in early March. Prices are given on page 1395.

Wire Products.—Business still lacks volume, although with most makers the number of orders is fairly large. The idea that prices will not advance in the near future is firmly established in the minds of buyers and they are also encouraged to pursue a hand-to-mouth buying policy by the price concessions being made by the smaller producing interests and the thought that this may be followed by the larger producers. It is more of a buyers' than a sellers' market. Prices are given on page 1394.

Tubular Goods.—The market still is quiet on standard pipe, but the mills are encouraged to look for better business by the fact that lately there has been considerable demand from the jobbers for tonnages of various sizes, evidently for the purpose of rounding out stocks. This is taken to mean that the movement from jobbers' stocks is on the increase. There is a good demand for oil country pipe, but line pipe orders still are light and, taking the business as a whole, it is no strain upon the country's capacity. Five of the 17 pipe furnaces in Youngstown are idle. The McCorkle Line Pipe Co. is reported to have practically completed negotiations for about 400 miles of 8- and 10-in. line pipe, approximately 25,000 tons, for a line to run from Aransas Pass to San Antonio, Tex., and it is understood the order will go to the National Supply Co., the National Tube Co., distributor. Mills might cut line prices to build up a backlog, but otherwise the market is firm. Boiler tubes are as dull as ever and with sellers more numerous than buyers, prices are weak. Discounts are given on page 1394.

Steel Rails.—There is still so little demand for light rails that it is no exaggeration to say that practically no market exists. Makers of these rails, rolling them from billets, are holding to the former price of 2c. base, but are getting no business.

We quote light rails; rolled from billets, 2c. base (25-lb. to 45-lb.); rolled from rail steel, 1.85c. to 1.90c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Sheets.—Demand still is on a tapering scale and specifications are so light against contracts that mill operations are likewise diminishing. Less than half of the independent mills in the Youngstown district are operating this week and reports from other producing districts are of the same tenor. Taking in the sheet-making subsidiary of the Steel Corporation, operations of the sheet mills are down to about 50 per cent of capacity. The American Sheet & Tin Plate Co., as of May 1, met the reduction in automobile sheets of $5 a ton, made by independent makers on April 22. Prices of common finishes still are easy, though no further definite declines are noted. On black sheets some mills would go to 3.50c. to secure orders, and there are reports of 2.75c. base on blue annealed and of 4.75c. base on galvanized. Prices are given on page 1394.

Track Supplies.—New business is very limited, but the railroads are specifying fairly freely on existing orders and this keeps most makers fairly busy, although it also means the exhaustion of order books and some disposition to make prices more attractive to stimulate orders. Prices are given on page 1394.

Iron and Steel Bars.—The effort of the Pittsburgh and Youngstown Mills is to maintain a price of 2.25c., base Pittsburgh, on soft steel bars and that price is the prevailing one on business in the so-called Pittsburgh area. Specifications on contracts from the makers of cold-finished steel bars are reported to be somewhat freer than they were recently, but the contract price has been revised to today's level. Jobbers are still buying very sparingly and there is only a limited demand from the bolt and nut makers. Iron bars are easier, with refined bars now quoted at 3c. base as against the recent minimum of 3.10c. base.

Plates.—Pittsburgh and Youngstown mills continue to quote 2.25c., but are not getting much business in this territory, and when they seek orders outside, particularly in the East, they are obliged to meet local conditions, which means a price at least $1 a ton less. Not much new business is coming to local railroad car builders and tank business is very slow in closing. Prices are given on page 1394.

Structural Material.—Demand for plain structural steel is decreasing in keeping with a diminishing number of structural projects. The price in the Pittsburgh district still is 2.25c., but that price is not obtainable in competitive territory. Prices are given on page 1394.

Tin Plate.—The American Sheet & Tin Plate Co. as of May 1 announced a continuance of the present price of $5.50 per base box, Pittsburgh, for standard coke tin plate for third quarter business. This announcement merely fulfills common expectations and has not been attended by any rush of specifications. The price is announced chiefly to enable can makers to set their prices. Specifications against July shipments are not due until May 15 and present indications

are that they will be rather backward, due to the fact that the mills are carrying sizable stocks of tin plate on second quarter contracts which the can manufacturers could not take out on account of the slow movement of cans incident to the backward spring. The leading interest has sustained a loss of about 20 per cent in mill operations, due to the exhaustion of storage space and unless there is early improvement of the movement from mill warehouses the independent manufacturers will soon be obliged to curtail production.

Cold-Finished Steel Bars and Shafting.—Business still is very slack, in keeping with conditions in the automotive industry, which constitutes the largest individual outlet for cold-finished steel bars. It is reported that the retail movement of automobiles has improved with better weather conditions, but this as yet has occasioned no increase in automobile producing schedules. With a number of automobile makers bringing out new models, there is a growing belief that the automobile industry will not in the near future get back to the producing rate and incidentally to the steel consuming rate of the first quarter of the year. Makers of cold-finished steel bars still are quoting 3c. base, Pittsburgh, but it is not denied that there have been deviations of as much as $2 a ton below that level. Ground shafting still is priced at 3.40c. base, f.o.b. mill, for carload lots.

Hot-Rolled Flats.—Business shows some improvement with some makers, but it had receded to such a low point in April, particularly in the strips, that the change could not have been in any other direction than toward betterment. April orders of some makers represented about one-third of capacity. Demand this month is really good, but it appears that the actual requirements of consumers are somewhat heavier than they were recently. The prevailing price on hoops, bands and strips is 2.75c., base Pittsburgh, but on wide strips, where the competition is sharp, concessions of as much as $5 a ton are noted. Prices are given on page 1394.

Cold-Rolled Strips.—Makers are experiencing considerable difficulty in maintaining the regular base of 4.75c., Pittsburgh, because demand is still very light and some of the newer additions to the ranks of producers are naming pretty low prices to secure customers. Quotation of 4.50c. is heard rather more frequently recently, and it is reported that that is the price of the Steel Corporation subsidiaries making cold-rolled strips.

Bolts, Nuts and Rivets.—Recent downward revision of bolt and nut prices has not been productive of increased orders. There is not enough business to go around and the new prices are only fairly well maintained. The rivet situation is somewhat improved from the price standpoint by the decision of one large producer to discontinue meeting competition. Demand still is moderate and those with orders for sizes which carry big extras are securing pretty low base quotations. Prices and discounts are given on page 1394.

Coke and Coal.—Suspension of shipments of furnace coke has been pretty frequent in the past week, and since production could not be curtailed promptly enough, much tonnage released through blast furnace suspension is pressing upon the market this week. These offerings are readily available at $3.50 per net ton at ovens, and since the railroads are pressing producers to move loaded cars, there have been quotations as low as $3.25. Spot foundry coke of standard grade still is quotable from $4.75 to $5. Much lower prices are reported on foundry grade, one sale of 3000 tons for shipment over the next 60 days having been made at $3.85 per net ton at ovens. This coke, however, was merely 72-hr. fuel, unselected, and machine rather than hand drawn. The coal market still is inactive and easy. Stocks accumulated in anticipation of a strike of the miners as of April 1 are not decreasing very rapidly because of the lower rate of consumption incident to curtailed industrial and railroad operations. Mine run steam coal is quotable from $1.50 to $1.75 per net ton at mine, mine run coking coal $1.75 to $2 and mine run gas coal from $2 to $2.25. Steam slack is a little more plentiful this week and available as low as $1.35 per net ton. Gas slack is priced from $1.50 to $1.75.

Old Materials.—Dealers who construed inquiries recently made by the mills for tonnage for the purpose of reducing cost averages as likely to result in business have been disappointed. They asked higher prices than such buyers would pay and no business was done. The market is weaker to the extent of this disappointment, but there is no real weakness, as there is no longer much "distress" material pressing on the market and not a few producers are stocking their supplies to the extent of their storage facilities rather than accept current prices. Some mills would pay $15.50 for heavy melting grade, but there are few dealers who will go below $16. The market has weakened again on compressed sheets and $14 now is the highest bid of any user of that grade. The Pennsylvania Railroad will award about 47,500 net tons of scrap this week, and the Baltimore & Ohio will take bids until noon, May 12, on 13,700 gross tons of old material.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$15.50 to $16.00
No. 1 cast, cupola size	18.00 to 18.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	18.00 to 18.50
Compressed sheet steel	13.50 to 14.00
Bundled sheets, sides and ends	12.50 to 13.00
Railroad knuckles and couplers	17.50 to 18.00
Railroad coil and leaf springs	17.50 to 18.00
Low phosphorus blooms and billet ends	18.50 to 19.00
Low phosphorus plate and other material	18.00 to 18.50
Railroad malleable	15.00 to 15.50
Steel car axles	17.50 to 18.00
Cast iron wheels	16.50 to 17.00
Rolled steel wheels	17.50 to 18.00
Machine shop turnings	10.50 to 11.00
Sheet bar crops	16.00 to 16.50
Heavy steel axle turnings	14.50 to 15.00
Short shoveling turnings	12.00 to 12.50
Heavy breakable cast	15.00 to 15.50
Stove plate	13.50 to 14.00
Cast iron borings	12.00 to 12.50
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	15.50 to 16.00

Production Reduced in the Mahoning Valley

YOUNGSTOWN, May 6—With iron and steel production on a definitely declining basis, executives in this district believe that business is now dragging bottom, and are hopeful for an early upturn in buying.

Production this week in the Mahoning Valley registered a new average low point for the year, between 50 and 60 per cent, both in steel department and in rolling mill averages.

The Youngstown Sheet & Tube Co. has temporarily suspended its Bessemer department for repairs and overhauling, and has banked two blast furnaces on this account. The company has also blown out another stack. Enough Bessemer steel has accumulated to supply rolling mills during suspension of the department, which will be for only a comparatively short period.

No. 1 blast furnace in the Ohio works group of the Carnegie Steel Co. is being blown out for repairs, but No. 3 stack in the same group, banked for repairs, will resume shortly. These suspensions reduce the number of active blast furnaces in the district to 24, of 45, though three of the inactive furnaces will resume production at an early date.

Of 51 independent open hearth furnaces in the district, 23 were scheduled this week for melting, and 53 of 120 sheet and jobbing mills. The sheet mill schedule announced at beginning of the week is—Youngstown Sheet & Tube Co., 14 mills; Newton Steel Co., 10; Sharon Steel Hoop Co., nine; Trumbull Steel Co. and Mahoning Valley Steel Co., eight each and Republic Iron & Steel Co., four. The Falcon Steel Co. also planned to start a number of mills early in the week, to operate for a few days rolling an accumulation of small orders.

Both the Thomas Sheet Steel Co. and the Waddell Steel Co., which have been operating on a part-time basis, are wholly suspended.

Chicago

Pig Iron Prices Decline Half Dollar—Decreased Mill Operations

CHICAGO, May 6.—The week has been exceptionally quiet in all departments of the iron and steel market. Buyers continue to limit their purchases to immediate needs, but are still specifying fairly freely against contracts. In fact, actual consumption of steel is holding up better than the current rate of buying would indicate. It is apparent that watchful waiting is the prevailing policy of purchasing agents, and it is unlikely that they will change their attitude until prices show signs of stabilizing. In this regard it may or may not be significant that local mills rolling plates, shapes and bars are showing increasing resistance to pressure for concessions. On soft steel bars 2.35c., Chicago, and on plates and shapes 2.45c. are rather generally adhered to, although exceptional departures from these figures have been reported. It is to be conceded, however, that new business has hardly been heavy enough to give these prices a severe test. Meanwhile, buyers' stocks are low and the time is approaching when they must be replenished. It cannot be denied, however, that stocks are reaching farther as industrial operations stand. The buyer himself is confronted with a diminishing demand for his goods. Manufacturing plants which were recently running full are now operating five or four days a week. This in turn is reducing the earnings of labor when it does not actually throw men out of employment.

In the building field, residential construction is still in full swing; yet demand for merchant pipe, plumbing supplies and sanitary ware has declined sharply. This is explained by the fact that materials and equipment for building work now under way have long since been contracted for.

Fresh evidences of the declining volume of steel business are to be found in the operations of local producers. Two additional steel works blast furnaces have gone out and the average steel output of leading mills is barely 80 per cent. In fact, a smaller interest largely serving the automobile industry has been forced by suspensions to curtail its operations to a 50 per cent basis. Bar iron mills are finding it difficult to maintain operations and among rails steel bar producers one has shut down for a week and two others are on a single turn basis. The average of wire plant operations stands somewhat between 50 and 60 per cent.

Pig Iron.—With demand exceedingly light, prices have declined another half dollar to $23 base local furnace. The melt in this district is gradually slowing down and foundries which until recently were running practically full are now operating five or four days a week. Some encouragement is to be found in the fact that a few of the melters serving the automobile industry have received releases against finished castings in stock. An Illinois sewing machine manufacturer is reported to have closed for 300 tons of foundry. A Wisconsin user is inquiring for 100 tons of foundry.

Quotations on Northern foundry, high phosphorus, malleable and basic irons are f.o.b. local furnaces and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or, when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$29.15
Northern coke, No. 1, sil. 2.25 to 2.75	23.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	23.00
Malleable, not over 2.25 sil	23.00
Basic	23.00
High phosphorus	23.00
Southern No. 2	$28.01 to 28.51
Southern No. 2 (barge and rail)	24.68
Low phos., sil. 1 to 2 per cent, copper free	30.50 to 31.00
Silvery, sil. 8 per cent	37.29
Electric ferrosilicon, 14 to 16 per cent	45.42

Ferroalloys.—Outside of local inquiries for one carload of each ferromanganese and 7 per cent ferrochromium, the ferroalloys are without feature.

We quote 80 per cent ferromanganese, $115.06, delivered; 50 per cent ferrosilicon, $75, delivered; spiegeleisen, 18 to 22 per cent, $42.56 to $43.56, delivered.

Cast Iron Pipe.—Lettings are few and there are no new prospects to report. Pipe buying, however, is generally the heaviest during the first four months of the year, and a slackening at this time is not unexpected. At the same time, pipe shops are booked from 60 to 90 days on 12-in. and smaller and are not in pressing need of additional tonnage. Nevertheless prices are somewhat easier, $47 base Birmingham being an increasingly common quotation. Steubenville, Ohio, has awarded 170 tons to James B. Clow & Sons. The National Cast Iron Pipe Co. will furnish 250 tons for Akron, Ohio. The United States Cast Iron Pipe & Foundry Co. will probably supply 800 tons for Metropolis, Ill. The Clow company is low bidder on 2300 tons for Barberton, Ohio.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $59.20 to $60.20; 6-in. and over, $55.20 to $56.20; Class A and gas pipe, $5 extra.

Plates.—In an exceptionally quiet week, the price situation has remained substantially unchanged. While it is reported that as low as 2.40c. Chicago has been done, that is still an exceptional figure and 2.45c. appears to be generally adhered to by the mills. The Standard Oil Co. of Indiana has placed four tanks for Whiting, Ind., and one for Detroit, involving a total of 1500 tons, with the Chicago Bridge & Iron Co. The Sinclair company has divided seventy-five small tanks, requiring 500 tons, between the Graver Corporation and James G. Heggie & Sons. The inquiry from the McCorkle Pipe Line Co. for 11,000 tons of tankage for Texas is still pending. Approximately one-half of the steel required for the cars recently ordered by the Chesapeake & Ohio will be furnished by a local mill. This will mean an addition of between 40,000 and 50,000 tons to the mill's books. The Baltimore & Ohio contemplates buying 8000 freight cars, including 5000 100-ton hopper cars.

The mill quotation is 2.45c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Structural Material.—Fabricating awards have declined sharply and new inquiries are few. At the same time, pending projects are slow in reaching the point of closing. The Ford Motor Co. has placed 1700 tons for an assembly plant at Dallas, Tex., with the Kansas City Structural Steel Co. An addition to the Hotel Sherman, Chicago, involving 3500 tons, is expected to be awarded this week. New prospects include bridge work for the Chicago, North Shore & Northern, amounting to 1900 tons. Fabricators in this district are running out of work and are making low quotations in their efforts to book fresh tonnage. Mill quotations, while not particularly strong, have undergone no real test and 2.45c. Chicago still represents the general market on plain material.

The mill quotation on plain material is 2.45c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Sheets.—The strike threat of the Amalgamated Association has caused buyers to show some concern about their future supplies. Obviously this is a poor time to make demands, which, it is estimated, would add more than 15 per cent to the rolling costs; in fact, it is freely predicted that mills would shut down rather than make any concessions to labor at this time. While sheet prices are still weak, less is heard of extremely low quotations and the rock bottom appears to be 2.80c. base Pittsburgh, on blue annealed, 3.65c. on black, 4.80c. on galvanized.

Mill quotations are 3.65c. to 3.85c. for No. 28 black, 2.80c. to 3c. for No. 10 blue annealed and 4.80c. to 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago: 4c. for blue annealed; 4.70c. for black and 5.60c. for galvanized.

Bars.—Prices on soft steel bars have been erratic, but, barring exceptional transactions, 2.35c. Chicago

still represents the ruling figure. The volume of new business is really too small to test the market. No one is buying anything beyond immediate needs, but specifications are still such as to indicate sustained consumption in practically all lines except the automobile industry. Bar iron is quiet at 2.30c. Chicago mill; in fact, producers find it exceedingly difficult to maintain operations. The recent reduction in rail steel bars to 2.20c. mill has brought in little additional tonnage. One hard steel bar mill has shut down for a week and two others are on a single turn basis.

Mill prices are: Mild steel bars, 2.35c., Chicago; common bar iron, 2.30c., Chicago; rail steel, 2.20c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotations on cold-rolled steel bars and shafting are 4c. for rounds and 4.50c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.60c., base; hoops, 4.45c.; bands, 3.95c.

Wire Products.—The best that can be said about this market is that it has grown no worse. Prices are still fairly well held, although here and there slight concessions have been made. For mill prices, see Finished Iron and Steel, f.o.b. Pittsburgh, page 1394.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, 3.65c. to 3.80c. per 100 lb.; cement coated nails, 3.10c. to 3.25c. per keg.

Rails and Track Supplies.—With one or two exceptions specifications from the railroads are such as to indicate normal spring activity. New business in rails and track supplies, however, is light. A local mill has booked 7000 kegs of spikes and bolts during the week. It has also taken orders from two traction lines for 2500 tons and 1000 tons of rails, respectively. The Pennsylvania has ordered 850 tons of tieplates from a Chicago mill and the Big Four is inquiring for an indefinite tonnage. The price situation, while still unsteady, is substantially unchanged.

Standard Bessemer and open-hearth rails, $43; light rails, rolled from billets, 2.10c. to 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.10c. mill; track bolts with square nuts, 4.10c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.75c. base, and track bolts, 4.75c. base.

Reinforcing Bars.—In a listless market, with lettings few and pending projects slow in maturing, prices are weak and erratic. However, 2.60c., Chicago warehouse, still appears to be fairly representative. Awards include:

Plant for Wisconsin Metal Products Co., Racine, Wis., 100 tons to Concrete Engineering Co.

Sewage station, Milwaukee, Wis., 250 tons of rail steel to Pollak Steel Co.

Additional steel for Ford Motor Co. plant, St. Paul, Minn., 115 tons to Kansas City Bolt & Nut Co.

Chicago, Milwaukee & St. Paul, 100 tons to unnamed fabricator.

Hollander warehouse, Chicago, 157 tons to Joseph T. Ryerson & Son.

Shorewood High School, Milwaukee, Wis., 150 tons to Concrete Engineering Co.

Des Moines, Iowa, electric plant, 150 tons of rail steel to LaClede Steel Co.

Pending work includes:

City bridge, Des Moines, Iowa, 100 tons.

Richardson Building, Cincinnati, 1000 tons, Samuel Klein, Chicago, consulting engineer.

Palmer Estate building, for Hartmann Furniture Co., Chicago, 200 tons.

Chicago Riding Club addition, Chicago, 100 tons.

New Atwater-Humboldt viaduct at Milwaukee, 750 to 800 tons.

Marquette University Stadium at Milwaukee, 500 tons.

Bolts and Nuts.—Maximum discounts are now on the basis of 60 and 10 and 10 off for large machine bolts, although as low as 70 and 5 off is not uncommon. The market is exceedingly weak, with business extraordinarily slow. For prices, which in this district are on a Chicago base, see page 1394.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.95c.; machine bolts up to ⅞ x 4 in., 55 and 5 per cent off; larger sizes, 55 and 5 off; carriage bolts up to ⅞ x 6 in., 50 and 5 off; larger sizes, 50 and 5 off; hot pressed nuts, squares and hexagons, tapped, $3.50 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off.

Old Material.—Consumer buying is at a minimum, but prices have shown little change. Some observers are of the opinion that the market has struck bottom and they are encouraged in their belief by the fact that certain low phosphorous steel grades have advanced slightly on recent orders from users. Railroad offerings are still heavy and the consumption of steel mills is declining, both of them factors for weakness rather than strength. It is pointed out, however, that scrap has already dropped to a very low level and for that reason alone it is unreasonable to expect it to decline much further. Railroad lists include the Baltimore & Ohio, 13,000 tons; Illinois Central, 10,000 tons; Santa Fe, 3000 tons; Pere Marquette, 2000 tons; Chicago & Alton, 1900 tons; Soo Line, 750 tons; Chicago & Eastern Illinois, 700 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$17.00 to $17.50
Cast iron car wheels	16.00 to 16.50
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	27.00 to 32.00
Forged steel car wheels	17.00 to 17.50
Railroad tires, charging box size	17.00 to 17.50
Railroad leaf springs, cut apart	17.00 to 17.50
Rails for rolling	15.00 to 15.50
Steel rails, less than 3 ft.	17.00 to 17.50
Heavy melting steel	13.50 to 14.00
Frogs, switches and guards cut apart	14.00 to 14.50
Shoveling steel	13.25 to 13.75
Drop forge flashings	10.50 to 11.00
Hydraulic compressed sheets	12.00 to 12.50
Axle turnings	12.00 to 12.50
Steel angle bars	15.00 to 15.50
Steel knuckles and couplers	16.50 to 17.00
Coil springs	18.50 to 19.00
Low phos. punchings	15.00 to 15.50
Machine shop turnings	7.00 to 7.50
Cast borings	10.00 to 10.50
Short shoveling turnings	10.50 to 11.00
Railroad malleable	18.50 to 19.00
Agricultural malleable	17.50 to 18.00
Per Net Ton	
Iron angle and splice bars	16.00 to 16.50
Iron arch bars and transoms	17.00 to 17.50
Iron car axles	24.50 to 25.00
Steel car axles	16.00 to 16.50
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.50 to 8.00
Cut forge	11.50 to 12.00
Pipes and flues	7.50 to 8.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	12.00 to 12.50
No. 1 machinery cast	17.50 to 18.00
No. 1 railroad cast	17.00 to 17.50
No. 1 agricultural cast	17.00 to 17.50
Locomotive tires, smooth	14.75 to 15.25
Stove plate	14.50 to 15.00
Grate bars	14.00 to 14.50
Brake shoes	14.50 to 15.00

Canadian Scrap Market

TORONTO, ONT., May 6.—Business in the Canadian iron and steel scrap market continues in a state of stagnation. Melters are showing but little interest in scrap requirements, and are only entering the market when stocks have been depleted and material is required for immediate use. Buying for stock purposes or on future account has almost entirely disappeared, in so far as the majority of foundries are concerned. Steel plants are placing orders against contracts resulting in a steady flow of heavy melting steel and turnings. Foundry activities have not improved, hence the demand for machinery cast, stove plate and malleable scrap is quiet. As a result of the recent reduction in the price of pig iron, together with the quiet state of the market, dealers in Toronto and Montreal districts have reduced their buying prices on some lines of scrap.

Dealers' buying prices are as follows:

	Toronto	Montreal
Gross Tons		
Steel turnings	$10.00	$8.00
Machine shop turnings	10.00	8.00
Wrought pipe	9.00	11.00
Rails	13.00	13.00
No. 1 wrought scrap	12.00	13.00
Heavy melting steel	12.00	12.00
Steel axles	15.00	13.00
Axles, wrought iron	18.00	20.00
Net Tons		
Standard car wheels	15.00	15.00
Malleable scrap	15.00	15.50
Stove plate	15.00	16.00
No. 1 machinery cast	18.00	20.00

New York

Slight Increase in Interest in Pig Iron—Some Ore Sales Made

NEW YORK, May 6.—A little more interest is shown in the pig iron market, but the only inquiries of any importance are one from the Gould Coupler Co., Depew, N. Y., for from 1000 to 2000 tons of malleable for delivery in the next 30 to 60 days, and 5000 tons of foundry from an unnamed melter, which it is expected will be closed within two or three days. Another inquiry is for 500 tons of foundry iron for spot delivery, and there are a few inquiries for smaller tonnages. Evidences of increasing weakness in prices have appeared. A statement by buyers that they could buy iron at $22.75 delivered for silicon 2.25 to 2.75, equivalent to $20, Buffalo furnace, is explained by the statement that the iron is 500 tons which was dumped into the river some months ago owing to the overturning of a barge, but was recovered. It seems to be pretty well understood, however, that $20 can be done for No. 2 plain Buffalo furnace, and that further concessions are being made in eastern Pennsylvania. The blowing out of furnaces accomplished and in prospect is the most encouraging feature of the situation. It is expected that the placing of furnaces on the idle list will continue until the market becomes more stabilized.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$24.77 to $25.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	24.27 to 24.77
East. Pa. No. 2, sil. 1.75 to 2.25	23.77 to 24.27
Buffalo, sil. 1.75 to 2.25	24.91 to 25.41
No. 2X Virginia, sil. 2.25 to 2.75	31.44
No. 2 Virginia, sil. 1.75 to 2.25	30.44

Iron Ore.—The Eastern ore market is like that of the lakes in showing very little activity. Sales of local ores within a few weeks have amounted to perhaps 35,000 tons, and it is understood that prices lower than those which could be made by either foreign or lake ore sellers were made. In several cases furnace companies which bought ore have since blown out their stacks and deliveries have been deferred.

Ferroalloys.—The same situation prevails as was in evidence a week ago. Reduced operations at steel mills are being further reflected in diminished demand for ferromanganese, and sales of small lots and carloads are fewer, though some have been reported. An inquiry for 100 tons with a possibility of expanding it into 500 was before the market today. Activity in spiegeleisen is very moderate. Prices for both alloys are unchanged.

Cast-Iron Pipe.—Heaviest purchasing is still by privately owned water and gas companies in the New York district. The low pig iron market is believed to be causing some deferment of purchases by New England users, who have not yet come into the market. The contract let by the Department of Water Supply, Gas & Electricity, New York, April 30, involving slightly more than 1000 tons of 48-in. water pipe, went to Felix Hanratty, 335 St. Ann's Avenue, New York. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $61.60 to $63.60; 4-in. and 5-in., $66.60 to $68.60; 3-in., $76.60 to $78.60, with $5 additional for Class A and gas pipe. Soil pipe business seems to be almost scraping bottom. Prices still hold, largely because it is felt that there would be no increase in demand, even at greater discounts. Consumers are inclined to ask deferred delivery, even on old contracts taken at lower than current prices. Jobbers seem to expect a reduction by makers. We quote discounts of both Southern and Northern makers, f.o.b. New York, as follows: 29½ to 30¾ per cent off list; heavy, 39½ to 40¾ per cent off list.

Warehouse Business.—Business is still confined to small orders in fairly good volume. Prices continue firm, despite the mill situation, particularly on black and galvanized sheets, on which the minimum seems to be rather well established at 4.85c. per lb. base for black and 5.85c. per lb. base for galvanized. With the mills offering longer deliveries as a result of lower rates of operation, some warehouses look for a slight increase in the tonnage of orders for material out of stock. A fair demand for high carbon tool steel is reported, but in this market also, orders are extremely small. Warehouses carrying wrought iron and steel pipe find the major portion of their business at present in small lots for immediate shipment. We quote prices on page 1412.

Coke.—Demand is light and the market continues weak, despite the low rate of production. Standard foundry ranges from $4.75 to $5.25 for prompt shipment and standard furnace is quotable at $3.75 to $4 per ton. By-product coke continues fairly active and prices are unchanged at $10.41, Newark and Jersey City, N. J.

Finished Iron and Steel.—Current bookings are running hardly 50 per cent of capacity but there is evidence that producers are focusing attention more than recently on costs, and price dips are not talked of as they were in the last few weeks. Underlying is the belief that stocks are hardly normal in the hands of either manufacturing consumers or jobbers and that replenishment buying is likely to be on a slightly ascending scale or sufficient to bring about some stabilization in prices. The net result is that steel bars appear to be a minimum at 2.25c. Pittsburgh, with structural steel fairly firm at 2.25c., though 2.20c. is claimed as possible, and with 2.80c. for blue annealed sheets, 3.65c. for black sheets and 4.80c. for galvanized sheets as the bottom figures on attractive tonnages. The fact remains that orders are generally for very small amounts and sellers feel no urge to attempt to get business on a price cutting basis. Steel plates alone show little stabilization and it seems clear that almost any size order can be placed at 2.15c., Pittsburgh basis. Rumors are numerous of plate prices down to 2c. but details of definite transactions are lacking. Interest lies in the price at which 3500 tons of plates for the Chesapeake & Ohio locomotives will be purchased. Close bidding is expected on some 500 tons of shapes and bars for the Pennsylvania Railroad. A round lot of structural steel bookings marks the week and a fair total of new projects is under negotiation, though a local strike of structural steel workers is likely to hold up contracting. Concrete road construction is slowly coming out. The Kalman Steel Co. will supply 375 tons of bars for New Jersey.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.59c. to 2.64c.; plates, 2.49c. to 2.59c.; structural shapes, 2.59c. to 2.64c.; bar iron, 2.54c.

Old Material.—Only small tonnages of practically all grades are moving to eastern Pennsylvania consumers and with the tendency of the market still downward, dealers and brokers report less material being offered. Shipments are being deferred in some instances. Prices for heavy melting steel continue at $14.50 per ton, delivered eastern Pennsylvania, with shipments going forward to Conshohocken, Coatesville and Steelton. As high as $15.25 per ton is being offered by brokers with contracts for delivery to a Claymont, Del., consumer. Machine shop turnings are weak at about $12.50 per ton delivered eastern Pennsylvania and borings and turnings are worth a half dollar less, but for shipment to a point taking a lower freight rate. Stove plate is being purchased at $13.75 per ton delivered to a New Jersey consumer.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$10.75 to $11.25
Steel rails, short lengths, or equivalent	11.25 to 11.75
Rails for rolling	15.00 to 15.50
Relaying rails, nominal	25.00 to 26.00
Steel car axles	17.00 to 18.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	14.00 to 14.50
Forge fire	7.50 to 8.00
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	9.25 to 9.75
Machine-shop turnings	8.25 to 8.75
Mixed borings and turnings	9.00 to 9.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.25
Stove plate	10.75 to 11.75
Locomotive grate bars	11.50 to 12.00
Malleable cast (railroad)	No market
Cast iron car wheels	15.00 to 15.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$16.50 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.50 to 16.00
No. 1 heavy cast, not cupola size	11.50 to 12.00
No. 2 cast (radiators, cast boilers, etc.)	13.50 to 14.00

Boston

Further Concessions Made by Pennsylvania and Buffalo Furnaces

BOSTON, May 6.—Further concessions have been made by eastern Pennsylvania and Buffalo furnaces for pig iron business in this territory, bringing prices well below cost of production. At least two Buffalo furnaces offer silicon 2.25 to 2.75 at $20 on cars or $24.91 delivered, and one has just sold 600 tons No. 2 plain to a Massachusetts melter at $19.50 furnace or $24.41 delivered. A Providence, R. I., concern this past week bought 500 tons eastern Pennsylvania No. 2X May and June delivery at $21 on cars or $24.65 delivered. Smaller sales of Pennsylvania No. 2X iron are reported at $21 on cars, and of Buffalo No. 2X at $20, $20.50 and $21, and No. 1X at $21. Furnaces in these two districts show an utter disregard for price differentials. In addition, two 1000-ton lots of Continental iron equivalent to our No. 2 plain, high phosphorus sold the past week. Price details are withheld, but it is stated original owners lost money on the deals. Half a dozen cars of Indian iron are included in the week's sales at $24 on dock, duty paid, Boston. It develops that a round tonnage of Dutch iron equivalent to our No. 2 plain sold within a fortnight at $25.20 delivered in Massachusetts. The local freight was $1.90 and other costs bring the on dock, duty paid, Boston, price down to $23.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$24.65 to $26.15
East. Penn., sil. 1.75 to 2.25	24.65 to 25.65
Buffalo, sil. 2.25 to 2.75	24.91 to 26.91
Buffalo sil. 1.75 to 2.25	24.91 to 26.41
Virginia, sil. 2.25 to 2.75	31.42 to 32.42
Virginia, sil. 1.75 to 2.25	30.92 to 31.92
Alabama, sil. 2.25 to 2.75	32.10 to 33.10
Alabama, sil. 1.75 to 2.25	31.60 to 32.60

Cast Iron Pipe.—Saugus, Mass., has awarded 8000 ft. 10-in. pipe to the Hammond-Byrd Iron Co., and is taking bids on an additional 1000 ft. The Warren Foundry & Pipe Co. is awarded 200 tons 24-in. pipe by Providence, R. I., and the Donaldson Iron Co. an equal tonnage of 6-in. and 8-in. by Quincy, Mass. Bids close May 8 on 200 tons 24-in. pipe required by Boston. The demand for pipe generally has slowed down of late, and manufacturers are shading prices, especially on 16-in. and larger material.

Finished Materials.—Prospective fabricating business shows a further contraction, consequently bookings by mills have dropped to a minimum. The Statler Hotel, Boston project, involving 7000 to 8000 tons, has been indefinitely postponed. The market for shapes remains 2.25c., Pittsburgh base. The demand for plates has fallen off to a degree where mills are accepting less than 20-ton lots. On ordinary business, 2.20c., Pittsburgh base, is the prevailing price, but on actual specifications for round tonnages 2.15c. can be done. Prices on bars are soft, although mills are not openly cutting prices. The Osgood Bradley Car Co., Worcester, Mass., has been awarded 125 all-steel cars for the Pittsburgh Railway, involving $1,000,000.

Warehouse Business.—Because of the increasing orders for one and two bundles of sheets, due to the cautiousness of buyers, and the increased cost of handling such business, warehouses have advanced prices on one bundle lots ½c. per lb. and on two bundle ¼c. On larger lots prices remain as heretofore. The movement of iron and steel out of warehouses appears to be decreasing rather than increasing. Rumor has it prices will shortly be reduced, but leading warehouses will not confirm or deny the story.

Soft steel bars, $3.51½ per 100 lb. base; flats, $4.40; plain and deformed concrete bars, $3.76½; small angles, channels and tees, $3.51½; structural steel, large angles and beams, $3.61½; tire steel, $4.80 to $5.15; open-hearth spring steel, $5 to $8; crucible spring steel, $12; steel bands, $4.31½ to $5.20; hoops steel, $5.80 to $6.30; cold rolled steel, $4.35 to $4.85; toe calk steel, $6.15; heavy plates, $3.61½; light plates, $3.86½; diamond pattern plates, stock sizes, $5.90; blue annealed sheets, $4.51½; refined iron bars, $3.51½; best refined iron bars, $4.75; Wayne, $5.50; Norway rounds, $6.60; Norway squares and flats, $7.10.

Coke.—Both the New England Coal & Coke Co. and the Providence Gas Co. announce that by-product foundry coke for May delivery against contracts will be $12 delivered within New England, the same price prevailing during the latter part of April. The former company during the first few days of May contracted for rising 100,000 tons of by-product coke for second half delivery at price ruling date of shipment, and also booked many thousands of tons of domestic fuel. The Providence Gas Co. is well sold ahead for the last half of 1924.

Old Material.—Almost nothing is doing in old material. Everybody appears to be standing pat waiting developments. Dealers have no orders of consequence, the recent buying being but a flash in the pan. Owners of material are not anxious to sell at prevailing prices. In the absence of business prices continue to ease off under their own weight. Machine shop turnings, rolling mill borings, forged scrap and bundled skeleton and rails for rerolling are easily $1 a ton lower, while machinery cast has dropped 50c.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$20.50 to $21.00
No. 2 machinery cast	18.00 to 18.50
Stove plates	15.00 to 15.50
Railroad malleable	16.50 to 17.00

The following prices are offered per gross ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.00 to $10.50
No. 1 railroad wrought	11.50 to 12.00
No. 1 yard wrought	10.50 to 11.00
Wrought pipe (1-in. in diam., over 2 ft. long)	9.00 to 9.50
Machine shop turnings	7.50 to 8.00
Cast iron borings, chemical	10.00 to 10.50
Cast iron borings, rolling mill	7.50 to 8.00
Blast furnace borings and turnings	7.50 to 8.00
Forged scrap and bundled skeleton	7.50 to 8.00
Shafting	15.00 to 16.00
Street car axles	15.00 to 16.00
Rails for rolling	10.50 to 11.00

Buffalo

Increased Activity in Structural Steel—Pig Iron Extremely Dull

BUFFALO, May 6.—The current period is the quietest in the pig iron market in months. The total inquiry was barely 1000 tons for all grades, and the principal lot asked for was a 300-ton foundry inquiry from New York State. Business is so light as to make a gage of the market difficult, but the small amount of business offering this week is not so conducive to cutting as some of the more sizable tonnage offered during the past month. The market is in a drifting stage and it is possible that lower prices than THE IRON AGE quotes might be done on medium tonnage, but it is not probable. Since no large lots are being offered, it is difficult to say what would be done on these. One furnace has announced it will not go below $21. Some producers see a better feeling and are hoping for a buying movement within a couple of weeks.

We quote f.o.b., gross ton, Buffalo, as follows:

No. 1 foundry, sil. 2.75 to 3.25	$21.50
No. 2 foundry, sil. 2.25 to 2.75	21.00
No. 2 plain, sil. 1.75 to 2.25	$20.50 to 21.00
Basic	21.00
Malleable	21.00
Lake Superior charcoal	29.28

Aluminum.—Demand is steady and business satisfactory. A local producer notes several 500 and 1000-lb. inquiries. On 99 per cent pure, a local producer's price is 28c.; on 98 to 99 per cent pure, 27c., and on No. 12 alloy, 23¾c., Buffalo, freight allowed.

Finished Iron and Steel.—The bright spot in the market this week is structural steel. Whether it is a flash in the pan or something more substantial, producers are not yet certain, but much better business has been done in shapes than for some weeks. One mill states that on material calling for prompt delivery, it was able to develop prices ranging between 2.40c. and 2.50c. This better feeling in shapes is reflected by fabricators, who note a brisk pick-up to inquiry. Jobs from 30 to 75 tons are coming out in volume. Power companies have been contributing greatly this spring to the building program and apartment and office build-

ing construction has kept up. One fabricator over a space of three days noted 15 inquiries. Reinforcing bars business is fair, with some good bookings hanging fire. Plate business is weak and the price 2.30c. to 2.35c. A good pipe demand from Canada for export to Peru is coming in. This affects lapweld sizes for oil-field development. Sheets are slack with 3.60c. the probable price on good black specifications for No. 28. It is probable that good galvanized specifications would bring out 4.75c. American bar business in Canada is suffering from English competition, the British mills being able to quote a price of $20 a ton under American mills and this is true to a large extent of English sheets. Nut and bolt business is slow with prices very weak. Sixty and 20 is being quoted on large machine bolts.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5c.; cold-rolled and round shafting, 4.45c.

Old Material.—Inactivity rules in almost every department of scrap buying so far as mills are concerned. Dealers are doing some purchasing for stocking purposes, apparently convinced that the time has now come to anticipate the demands of mills for months, but mills have almost entirely ceased buying. One mill has taken a little heavy melting steel around $14, but since its stockpile is substantial and its operations decreasing, its surplus is adequate to run its open hearths without further stocking up. Mills say that the present business in steel does not justify heavy buying and until business shows a distinct upward turn will probably continue to buy only very small lots. While some heavy melting steel has been bought at less than $14, it is doubtful whether a real tonnage could be picked up for less than $15. Little material in the recently closed railroad lists is thought to have come to Buffalo. Prices are nearly all nominal.

We quote f.o.b., gross ton, Buffalo, as follows:

Heavy melting steel	$14.00 to $15.00
Low phos., 0.04 and under	20.00 to 21.00
No. 1 railroad wrought	12.50 to 13.00
Car wheels	17.50 to 18.00
Machine shop turnings	10.00 to 10.50
Cast iron borings	12.00 to 12.50
No. 1 busheling	13.00 to 13.50
Stove plate	15.00 to 15.50
Grate bars	14.50 to 15.00
Bundled sheets	8.00 to 9.00
Hydraulic compressed	13.50 to 14.00
Railroad malleable	19.00 to 19.50
No. 1 machinery cast	17.50 to 18.00

Cincinnati

Further Concessions Reported on Moderate Tonnages of Pig Iron

CINCINNATI, May 6.—The most important sale of pig iron the past week was of 1500 tons of foundry iron to a nearby melter at a reported price of $23 delivered, or considerably below the Ironton price. The price, however, cannot be confirmed, but for resale a quotation of $22, Ironton, failed to take the business. Sales generally consist of one to two carload lots, and are mostly of Northern irons. Prices are the same as last week, but on attractive tonnages it is possible that considerably lower would be quoted by both Northern and Southern producers. The Southern market is still quoted at $22, Birmingham. There is little interest in basic or Bessemer, although a central Ohio melter added 500 tons of basic to an order at $21.50. A sale of several hundred tons of silvery was made to a melter in this district, and it is said that the regular schedule was shaded on this business.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$26.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	26.55
Ohio silvery, 8 per cent	35.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	24.77
Basic Northern	23.77
Malleable	24.77

Sheets.—The American Sheet & Tin Plate Co. opened its books for third quarter at 3c. for blue annealed, 3.85c. for black, 5c. for galvanized and 5.10c. for automobile body sheets, the latter a reduction of $5 per ton from its second quarter price. The old price of $5.50 per base box on tin plate has been reaffirmed. Little business is being placed, and the sheet market is at least $3 per ton under these prices, with quotations of 4.80c. on galvanized frequently heard. It is reported that some mills have sold galvanized sheets in Southern territory at 4.50c.

Structural Activity.—Building permits in the larger cities of this district for the month of April exceeded all records for a similar period. Most of the permits were for residential and apartment buildings, though a few industrial projects were included. More activity is noted in both inquiries and awards.

Reinforcing Bars.—Increased demand for reinforcing bars is noted, a number of large projects being up for bids. These include a water works reservoir at Cincinnati, 1000 tons; the Richardson loft building, Cincinnati, 350 tons; extension of the Rapid Transit development, Cincinnati, 1000 tons; addition to the Alms Hotel, Cincinnati, 500 tons, and warehouse building for Standard Sanitary Mfg. Co., Indianapolis, 330 tons. Awards include St. Theresa's Home, Silverton, 150 tons, to Bourne-Fuller Co., and 275 tons for the Metropole Hotel addition, to Pollak Steel Co. Prices are about the same as last week, the range being from 2.10c. for rail steel bars to 2.30c. for bars rolled from new billets.

Warehouse Business.—Local jobbers report a large number of orders for small tonnages, and on the whole consider conditions satisfactory. Jobbers of wire products report a light movement, however, and prices of wire nails have been cut 10c. per keg, the quotation now being $3.40.

Coke.—Carload orders for coke predominate, but the number of such orders is on the increase. Prices are soft, and production is being curtailed in New River and Wise County districts. Some operators in New River are understood to have offered foundry grades at $9, ovens. Prices from other districts are unchanged.

Connellsville furnace, $3.75; foundry, $4.75; New River foundry, $9.00 to $10.00; Wise County furnace, $4; foundry, $5; by-product foundry, $7.50. Connellsville basis.

Old Material.—While the scrap market is still rather dull, there were a few sales of small tonnages last week, and a better feeling is apparent on the part of sellers. Apparently the decline has been halted for the time being at least, as prices quoted last week are still in effect.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton	
Heavy melting steel	$11.00 to $11.50
Scrap rails for melting	10.50 to 11.00
Short rails	15.50 to 16.00
Relaying rails	27.00 to 27.50
Rails for rolling	12.50 to 13.00
Old car wheels	11.50 to 12.00
No. 1 locomotive tires	12.50 to 13.00
Railroad malleable	13.50 to 14.00
Agricultural malleable	12.50 to 13.00
Loose sheet clippings	7.00 to 7.50
Champion bundled sheets	9.00 to 9.50
Per Net Ton	
Cast iron borings	7.50 to 8.00
Machine shop turnings	6.50 to 7.00
No. 1 machinery cast	16.50 to 17.00
No. 1 railroad cast	13.00 to 13.50
Iron axles	19.50 to 20.00
No. 1 railroad wrought	9.00 to 9.50
Pipes and flues	6.00 to 6.50
No. 1 busheling	7.50 to 8.00
Mixed busheling	5.00 to 5.50
Burnt cast	9.00 to 9.50
Stove plate	9.00 to 9.50
Brake shoes	10.00 to 10.50

Finished Material.—The demand for finished materials continues light. An inquiry for 2500 tons of special plates from Louisville, Ky., is held in abeyance for the time being. The Big Four Railroad has placed its second quarter steel requirements through the New York Central Lines. Tank plates are in only fair demand, carload orders predominating. Prices are practically unchanged from last week, 2.25c. being the generally accepted market on small tonnages. Shapes are in better demand, and while the regularly quoted price is 2.30c., it is possible to place attractive orders at less. Bars are now being quoted at 2.25c. Reports that wire nails are being sold at $2.90 per keg do not appear to be well founded, and the general practice seems to be to quote a price of $3 per keg at mill. Southern Ohio mills are still getting the bulk of the nail business placed in this district. Wire fence is moving in slightly improved volume, but at best the market is spotty.

Bolts and nuts are in fair demand, and prices elastic. Little inquiry is current for light rails and frogs and switches, stagnation in the coal trade being responsible for this condition. Track materials are also in light demand, occasional carloads making up the bulk of the orders. Cold-rolled products are dull, and on bars 2.85c. can be done, with reports of 4.50c. having been quoted on cold-rolled strips. Hoops and bands are in light demand, and keen competition is had on each inquiry. The market is now hardly above 2.75c., although some companies are still maintaining a price of 2.90c.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.25c.; cold-rolled flats, squares and hexagons, 4.25c.; open-hearth spring steel, 5c. to 6c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, 3.60c.; common wire nails, $3.40 per keg base; cement coated nails, $3 per keg.

Birmingham

Very Little Selling of Pig Iron and Prices Are Untested

BIRMINGHAM, ALA., May 6.—The Southern pig iron market is still slow. But production of iron has been increased by the blowing in of the Hattie Ensley blast furnace at Sheffield, in the northwestern part of the State, on the Tennessee River, by the Sloss-Sheffield Steel & Iron Co., making five out of eight of the blast furnaces of the company now in operation. The quotations are still weak, the range being from $22 to $23, with a report current that a little tonnage has been sold on a base of $21.50. Small-lot orders still predominate in the Birmingham district. Steady consumers are said to be negotiating for pig iron and though invariably the reply is that the sales are in small lots, there is suspicion that orders are being placed. The resumption of operations at the Sheffield furnace by the Sloss-Sheffield company was brought about by a scarcity of some grades and the fact also that the surplus iron on yards had been cut into deeply. One or two of the smaller companies added to their stocks of iron on yards last month, while the more active producers have been cutting down their surplus.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

No. 1 foundry, 2.25 to 2.75 sil.	$21.50 to $22.50
No. 2 foundry, 1.75 to 2.25 sil.	21.00 to 22.00
Basic	21.50 to 22.50
Charcoal, warm blast	32.00 to 33.00

Cast Iron Pipe.—Southern manufacturers of cast iron pipe, pressure pipe, are now satisfied that expectations of sufficient business to warrant the steady and almost capacity operation of plants through the summer is in sight. Lettings in various tonnage sizes are received every day. The shipments are being made as quickly as possible and estimate is that there is as much pipe being moved as is being produced. The Middle West and Northwest are proving steady buyers of Southern cast iron pipe. Chicago territory has been very active in pipe buying recently. Soil pipe demand shows a little improvement again. One of the active fittings concerns has curtailed production some.

We quote class B, 4-in. water, $52 to $53; 6-in. and over, $48 to $49; class A, $5 higher; standard soil pipe, $60; heavy gage, $45; standard fittings, $110.

Coke.—Delivery of coke is being urged by consumers who are buying yet in small lots. Practically all of the new business is spot business. The quotations remain firm, foundry coke ranging from $6 to $6.50 per ton, with the first named figure as most prominent. By-product coke ovens are operatnig to greater percentage of whole now than for some time. Fifty additional beehive ovens were recently ignited and some beehive ovens which were not rushed have been shoved up a few hours, the need for coke under the hand-to-mouth plan showing improvement. Active request for steady delivery means steady operation of many industries.

Old Material.—New business in scrap iron and steel in the South is almost nothing, a car every now and then being reported, the week's tonnage being as small as it ever was almost. Dealers still have tonnage to deliver on old contracts and there have been but few, if any, instructions to hold up on delivery. Dealers are also keeping their yards up, bringing in as much old material as is being shipped out. Operation of but two open-hearth furnaces at the plant of the Gulf States Steel Co. at Gadsden is not very encouraging to those with heavy melting steel to offer. No. 1 cast and stove plate have been the only products receiving inquiries.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Cast iron borings, chemical	$15.00 to $16.00
Heavy melting steel	13.50 to 14.00
Railroad wrought	12.00 to 13.00
Steel axles	19.00 to 19.50
Iron axles	20.00 to 20.50
Steel rails	12.00 to 13.00
No. 1 cast	20.00 to 20.50
Tram car wheels	17.00 to 18.00
Car wheels	16.00 to 17.00
Stove plate	15.50 to 16.50
Machine shop turnings	7.00 to 8.00
Cast iron borings	8.00 to 9.00
Rails for rolling	16.50 to 17.00

St. Louis

Sales of Basic Made and Inquiries for 15,000 Tons Are Pending

ST. LOUIS, May 6.—The first sales of any consequence in some time were made last week by the St. Louis Coke & Iron Co. Both were of basic grades for prompt shipment, 2500 tons being for a St. Louis melter and 1000 tons for an East Side melter. With these exceptions, sales have been confined almost entirely to carloads. Two inquiries for basic are pending, one for 5000 and one for 10,000 tons. The stove plants report business quiet. No inquiries are pending, and it seems likely that melters will continue a hand-to-mouth buying policy for the remainder of this quarter, at least. The market is easier. The St. Louis Coke & Iron Co. is quoting $23 to $24, Granite City; Northern iron, $23 to $23.50, Chicago, and Southern, $22 to 23, Birmingham. These quotations are regarded as nominal. It is reported that Chicago makers have offered iron here as low as $21.50.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Florence and Sheffield (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$25.16 to $25.66
Northern malleable, sil. 1.75 to 2.25	25.16 to 25.66
Basic	25.16 to 25.66
Southern fdy., sil. 1.75 to 2.25 (rail)	27.17 to 28.17
Southern foundry, sil. 1.75 to 2.25 (rail and water)	25.28 to 26.28
Granite City iron, sil. 1.75 to 2.25	23.81 to 24.81

Finished Iron and Steel.—Outside of business by warehouses, whose orders are greater in numbers but smaller in volume than at this time last year, there is almost nothing doing. Warehouses themselves are not buying, nor are manufacturers of steel products. Railroads are marking time and they have no inquiries of consequence pending.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold-rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 4.70c.; structural rivets, 4.15c.; boiler rivets, 4.35c.; tank rivets, ¾-in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, squares or hexagon blank, $2.50, and taped, $2.50 off list.

Coke.—Expected heavy orders by gas companies have not yet materialized. There is no interest in domestic grades, and users of foundry grades are well supplied for the present.

Old Material.—The small amount of old material bought last week by consumers was confined to cast iron items. Other consumers are not interested in buying. Dealers are interested only in spot shipments that can be applied against contracts. The only contracts of consequence pending are involved in the orders

placed by the American Steel foundries which expire this month. Light relaying rails are in fair demand, but there is no demand for the heavier rails. The Missouri Pacific list of 3500 tons closed last week. New railroad lists include: Pennsylvania System, 45,000 tons; Santa Fe, 3000 tons; Chicago & Alton, 1800 tons; Mobile & Ohio, 1200 tons, and St. Louis-San Francisco, 800 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$12.00 to $12.50
Rails for rolling	15.00 to 15.50
Steel rails less than 3 ft.	17.00 to 17.50
Relaying rails, 60 lb. and under	25.00 to 26.00
Relaying rails, 70 lb. and over	32.50 to 33.50
Cast iron car wheels	16.00 to 16.50
Heavy melting steel	14.00 to 14.50
Heavy shoveling steel	14.00 to 14.50
Frogs, switches and guards cut apart	14.00 to 14.50
Railroad springs	17.00 to 17.50
Heavy axles and tire turnings	12.00 to 12.50
No. 1 locomotive tires	15.00 to 15.50
Per Net Ton	
Steel angle bars	14.00 to 14.50
Steel car axles	15.50 to 16.00
Iron car axles	22.00 to 22.50
Wrought iron bars and transoms	18.00 to 18.50
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	12.50 to 13.00
Cast iron borings	10.00 to 10.50
No. 1 busheling	12.50 to 13.00
No. 1 railroad cast	18.00 to 18.50
No. 1 machinery cast	18.00 to 18.50
Railroad malleable	16.00 to 16.50
Machine shop turnings	7.00 to 7.50
Champion bundled sheets	8.00 to 8.50

Philadelphia

Very Little Buying—Operations of Steel Mills Reduced

PHILADELPHIA, May 6.—The iron and steel market in the Philadelphia district is exceptionally quiet. While tonnage in some lines is moving, it is generally small in volume, consistent with the policy of consumers of buying on a hand-to-mouth basis. This is attributed partly, at least, to the weakened condition of the market, but producers maintain that prices have reached their minimum levels, or virtually so. It is their contention that once buyers are assured that this situation has actually developed they will come into the market and stimulate it considerably, although there are no present indications of buying in large quantities.

Operations of steel mills generally are rated at between 40 and 50 per cent, but some mills are fairly booked on old orders which assure more satisfactory mill schedules for two months or so. In lines such as plates and shapes, some mills have bookings calling for fair operations for a month to six weeks, while in other lines, such as tin plate, steel bars and pipe, a better situation obtains. The plate market is especially spotty and has become weaker in some instances, although quotations vary with the different mills, running from 2.10c. to 2.30c., Pittsburgh. Generally the market seems to be around 2.15c., with indications that a good inquiry would bring out a lower level. Shapes are quoted at 2.10c. to 2.20c., and bars at 2.20c. to 2.30c.

The scrap market has declined. The pig iron market is listless, with practically no inquiries or sales. New tonnage that is moving consists principally of small lots and involves foundry grades in most cases. Except for basic iron, prices are unchanged. Basic has declined 50c. a ton and now can be bought for $21 to $21.50, delivered. One hopeful element is that stocks of iron and steel are comparatively small and it is expected that when a buying movement takes place it will be of a healthy character.

Pig Iron.—The absence of activity in the market for pig iron makes definite quotations difficult. The undertone of the market has grown weaker, but aside from basic iron, no price changes have taken place the past week. Basic has eased off further and now is quoted at $21 to $21.50, delivered eastern Pennsylvania. Inquiries for all grades are extremely light and sales are only of small sizes, generally for carlots. Foundry grades represent most of the small amount of business going and the market for these grades is spotty. Some foundries are operating at good capacity, while others are on restricted schedules. Those supplying requirements of the textile industry are faring better than others. Shipments of iron from furnaces are prompt. Furnace operators report that yards and melters both have only small stocks on hand. While prices are easy, it is noticeable that regular customers do not quibble over quotations, but are willing to pay prices for the kind of tonnage required. Foreign iron does not appear to be a factor in the market because of the small import movement. During the week ending May 3, imports to this district amounted to 1150 tons and came from British Indies.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$22.26 to $23.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.76 to 23.63
East. Pa. No. 1X	23.26 to 24.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	30.17 to 31.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.67 to 31.67
Basic delivery eastern Pa.	21.00 to 21.50
Gray forge	22.00 to 22.50
Malleable	23.00 to 23.50
Standard low phos. (f.o.b. furnace)	25.00 to 26.00
Copper bearing low phos. (f.o.b. furnace)	25.00 to 26.00

Ferroalloys.—The market for ferroalloys is extremely dull. There are few inquiries and these involve small lots. The price of standard ferromanganese remains unchanged at $107.50, furnace or seaboard, for both domestic and imported material. Spiegeleisen continues to be quoted at $36, seaboard or furnace. Imports of manganese ore for the week ending May 3 to this port consisted of 6665 tons from British West Africa and 1000 tons from Calcutta.

Billets.—The market for billets remains unchanged and quiet. Prices are quoted at $38, Pittsburgh, for rerolling billets and at $43, Pittsburgh, for light tonnages of forging billets.

Plates.—The plate market is unsettled. Prices quoted vary from 2.10c. to 2.30c., Pittsburgh, with perhaps the generally named figure being 2.15c., but it is likely that an inquiry for a large tonnage would develop the minimum quotation. Inquiry is light and involves tank and locomotive material mostly. The Pennsylvania Railroad is inquiring for 200 to 500 tons of miscellaneous boiler and fire box plates. Shipyards in this district are operating at extremely low capacity. Delivery of plates is being made promptly.

Structural Material.—Shapes are being quoted by Eastern mills at 2.10c. to 2.20c., Pittsburgh, and the lower quotation is commonly made on desirable tonnages. There are a few small inquiries for building work. Fabricating shops are engaged well on backlog business.

Sheets.—Moderate activity exists in the market for blue annealed sheets, but production still exceeds shipments. Prices of this grade, however, are slightly easier with some quotations at 2.80c., but they still range as high as 2.90c., Pittsburgh. Black sheets still are quoted at 3.65c. to 3.75c. and galvanized at 4.85c. to 4.90c., Pittsburgh.

Warehouse.—Jobbers report that the market for warehouse products is unchanged, with fair activity in some lines. They are keeping stocks well in hand.

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.50c.; round edge steel, iron finished, 1½ x ½ in., 3.50c.; round edge steel planished, 4.30c.; tank steel plates, ¼ in. and heavier, 3.57c.; tank steel plates, ⅛ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 3.90c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.47c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.30c.; ⅛-in., 5.50c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ⅛-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

Bars.—While demand for steel bars is quiet, this market is stronger than that for either plates or shapes, but is somewhat easier than last week and is now gen-

erally quoted at 2.25c., Pittsburgh. No change has been made in the market for bar iron, which is quoted at 2.20c., Pittsburgh. The steel bar market finds some strength in the fact that there is a lack of stocks in the hands of producers and jobbers. Delivery on the average assortment ranges from three to four weeks, but on round lots of a single size shipments are being made in two weeks.

Old Material.—Declines of 50c. to $1 a ton have taken place in the market for a number of grades of scrap iron and steel. The market generally reflects an easier tone, but is extremely dull, with only small business developing. No 1 heavy melting steel, along with some other grades, have maintained the minimum quoted last week, but the higher quotations have disappeared. Dealers report that stocks in yards and in the hands of consumers are low and are reluctant to enter the market actively, preferring to hold what they have because of the low prices and inability to make profits on sales.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.00
Scrap rails	15.00
Steel rails for rolling	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	19.50 to 20.00
Couplers and knuckles	17.50 to 18.00
Cast-iron car wheels	17.00 to 17.50
Rolled steel wheels	17.50 to 18.00
No. 1 railroad wrought	17.00 to 17.50
No. 1 yard wrought	16.00 to 17.00
No. 1 forge fire	12.50 to 13.00
Bundled sheets (for steel works)	12.00
Mixed borings and turnings (for blast furnace use)	11.00 to 12.00
Machine shop turnings (for steel works use)	12.50
Machine shop turnings (for rolling mill use)	12.50 to 13.00
Heavy axle turnings (or equivalent)	14.00 to 14.50
Cast borings (for steel works and rolling mills)	13.00 to 13.50
Cast borings (for chemical plants)	14.00 to 15.00
No. 1 cast	17.00 to 17.50
Heavy breakable cast (for steel plants)	14.00 to 14.50
Railroad grate bars	14.00 to 14.50
Stove plate (for steel plant use)	14.00 to 14.50
Wrought iron and soft steel pipes and tubes (new specifications)	14.00 to 14.50
Shafting	19.00 to 20.00
Steel axles	19.00 to 20.00

Cleveland

Mills Resist Pressure of Buyers for Lower Prices—Plate Mill Closed

CLEVELAND, May 6.—Mills have commenced to show some resistance to the pressure of buyers against further price reductions and quotations have shown little change during the week. On steel bars and structural material 2.25c. is the common price, although small lot sales are being made at 2.30c. and one producer declines to shade that price. Plates continue both very weak and in slow demand, but have not further declined. In this territory the minimum plate price is 2.20c., although most mills are holding to 2.25c. The Otis Steel Co. has temporarily shut down its Riverside plate mill. With the curtailment of the automobile industry, strip mills are in greater need of orders and hot-rolled strip steel is quoted as low as 2.50c., the price ranging up to 2.75c. for bands. Sales of hoops are still being made at 2.90c. in spite of reports of 2.75c. Cold-rolled strip steel is being freely offered at 4.50c. Although the volume of business continues light, some of the mills report a slight improvement. Consumers continue to follow a hand-to-mouth policy in buying and order in small lots. This attitude of buyers has resulted in considerable increase in warehouse orders. In the building field there is a moderate volume of work in prospect, but competition is keen and some jobs are being taken at very low prices.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 28 black sheets, 4.55c. to 4.65c.; No. 28 galvanized sheets, 5.65c.; No. 10 blue annealed sheets, 3.65c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No. 9 annealed wire, $3.50 per 100 lb.; No. 9 galvanized wire, $3.95 per 100 lb.; common wire nails, $3.60 base per 100 lb.

Pig Iron.—The inquiries for foundry iron for the third quarter reported last week resulted in one sale of 3000 tons to a western Ohio foundry, but no other business for that delivery has been closed. A Richmond, Ind., foundry placed 700 tons for the third quarter, this sale being credited to a lake furnace and a Galion, Ohio, consumer placed 200 tons. Aside from these transactions, there was virtually no activity during the week and little inquiry is pending. As the market lacks strength, it is uncertain what price a good inquiry would bring out. In the Valley district $21 has become the more common price for foundry iron, although $21.50 is still being asked for small lots. In western Ohio, northern Indiana and Michigan the price is around $22, but at points that are affected by Valley and Buffalo competition, the market is apparently not above $21. In Cleveland local furnaces are still holding nominally to $23, at which car lot sales have been made, but Valley competition would doubtless bring out lower quotations on a fair-sized lot, as Cleveland consumers can buy Valley iron at $22.76 delivered. The American Steel Foundries is inquiring for 500 tons of low phosphorus iron, which is now firm at $28.50. A $22 price is reported on Bessemer iron. Sellers in considering the prospect of a third quarter buying movement are taking into consideration that a great deal of second quarter iron will be carried over to the third quarter. Some of the automobile foundries that are large consumers have taken very little iron since April 1, so that they are now 30 days behind in taking shipments. The Trumbull-Cliffs furnace at Warren will be blown out for relining about May 15, but the Trumbull Steel Co. will not be in the market for pig iron, as it will be supplied from a regular outside source.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$21.00
N'th'n No. 2 fdy., sil. 1.75 to 2.25	23.50
Southern fdy., sil. 1.75 to 2.25	28.00
Malleable	23.50
Ohio silvery, 8 per cent	35.52
Stand. low phos., Valley furn.	28.50

Iron Ore.—Shipments of Lake Superior ore were large during April, considering the condition of the market. The amount shipped from upper lake ports during the month was 659,387 tons as compared with 14,184 tons during April last year when ice conditions prevented an early start. The Steel Corporation will have practically all of its vessels in commission before the end of the week, but the ore movement by independent consumers will be light this month. The market continues quiet with sales limited to small lots. For prices, see page 1395.

Sheets.—The sheet market continues weak and lower quotations have appeared on blue annealed sheets in spite of efforts of one or two Valley district mills to stiffen up a little on prices. Black sheets are quoted at 3.60c. to 3.65c., blue annealed 2.75c. to 2.85c., and galvanized sheets at 4.90c. New demand is light and few specifications are being released by the automobile manufacturers.

Reinforcing Bars.—The demand for small lots has become fairly good. Bids will be taken this week for the Mahoning Bank, Youngstown, Ohio, requiring 135 tons. Prices are unchanged at 2c. to 2.10c. for rail steel bars and 2.25c. to 2.30c. for billet steel bars.

Semi-Finished Steel.—With no new demand, prices are untested, but the market lacks strength and mills are in need of orders. A Valley district mill has reduced its quotation on slabs to $39, but billets are still commonly quoted at $40 and sheet bars at $41. The McKinney Steel Co. is still operating eight out of 13 open-hearth furnaces.

Bolts, Nuts and Rivets.—Bolt and nut prices are holding to the reductions reported last week. When these reductions were announced, no change was made on stove bolts which were irregular, but had not settled down to any definite price. These have now been reduced 5 per cent. Consumers are ordering only in small lots. The leading local rivet manufacturer has formally advised the trade that it will adhere to 2.75c. for large rivets and some specifications on contracts are being received at this price, although concessions of $2 a ton

are reported by other makers. The same producer is holding to 70 per cent off list for small rivets.

Coke.—The foundry coke market is weaker and some makers of high grade brands of Connellsville coke who have been holding to $6.50 have reduced their price to $6. Other standard makes are quoted down to $4.75.

Old Material.—While the market continues weak, price declines during the week were limited to two or three grades. Although it is claimed that the consumption of scrap has decreased to a greater extent than production, the bulk of material is being absorbed in filling old contracts. Sales to consumers are limited to odd lots that dealers are forced to move. One Cleveland mill is holding up shipments.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$13.00 to $13.25
Rails for rolling	14.75 to 15.50
Rails under 3 ft.	15.25 to 15.50
Low phosphorus melting	16.00 to 16.25
Cast iron borings	10.50 to 10.75
Machine shop turnings	10.50 to 10.75
Mixed borings and short turnings	10.50 to 10.75
Compressed sheet steel	10.75 to 11.00
Railroad wrought	10.25 to 10.50
Railroad malleable	16.25 to 16.50
Light bundled sheet stampings	9.75 to 10.00
Steel axle turnings	11.00 to 11.25
No. 1 cast	19.00 to 19.50
No. 1 busheling	9.50 to 9.75
Drop forge flashings	8.00 to 8.25
Railroad grate bars	13.25 to 13.50
Stove plate	13.25 to 13.50
Pipes and flues	8.25 to 8.50

San Francisco

Structural Steel the Strongest Material—Pig Iron Business Fair

SAN FRANCISCO, April 30.—Business continues fairly active and the improvement noted during the past few weeks has been sustained, although not up to the expectations of some producers and sellers. Several jobbers express the opinion that the contraction of business in some of the leading steel centers of the East necessarily has a reflective influence on this coast, but the trade generally considers this more theory than reality, considering the present industrial conditions of the country. The strongest element in the trade is in the structural steel lines, the same as it was two weeks ago. The inquiry for plates, shapes and bars shows a little easiness doubtless due to some hesitancy in the demand, but this is merely a transitory feature of no special significance. An event of more than ordinary importance to this coast is the completion of two units of the big plant of the Pacific Sheet Steel Co., a subsidiary of the Metal & Thermit Corporation, New York, as reported in THE IRON AGE. The Columbia Steel Company at Pittsburgh, in Contra Costa County, has also commenced the manufacture of steel sheets. Sheet steel has never before been made on this coast. The completion of these two big plants for making steel sheets marks the beginning of a new era in the steel industry on the Pacific Coast.

Pig Iron.—The volume of business continues of very fair proportions, particularly for the better grades of material. Fluctuations in prices are confined within narrow limits and importers say there is no accumulation of supplies. Prices for desirable Scotch and English iron are still $31 to $31.50 per ton, coast ports, duty paid. There was a small lot of mixed English and Belgian iron, some 200 tons, which was sold at $30, and this sale started a report that importers had cut the price, but the conclusion was erroneous, the quoted figures being held steady. Receipts of French and other continental iron are still liberal and prices remain practically unchanged, with $27.50 to $29 as the ruling figures, although there has been some slight shading in several instances. While deliveries of this class of iron are more prompt than earlier in the year, there is still considerable uncertainty as to arrivals where immediate use is concerned.

Finished Iron and Steel.—Inquiries are numerous, but in some quarters sellers say there is still some backwardness in placing orders except for immediate requirements, there being an undercurrent of belief that prices may be a little lower shortly. At present the ruling prices are the same as two weeks ago, and are held steady. For structural shapes and angle, 2.85c. is quoted in carload lots with small parcels slightly higher. The same figure applies to merchant bars. Wire and rods for reinforcing purposes are in good demand and many new orders are being booked. During the past two weeks over 1000 tons of wire rods was shipped to British Columbia. Nails, nuts and rivets are moving freely with some very liberal orders from the southern part of the State.

Coke.—Buyers are taking a little more freely than for some time past and stocks are well cleaned up. Prices are a trifle lower, ranging from $18 to $20 per ton for foreign and domestic, the higher price based on the Eastern quotation. Desirable lots of clean-forked coke readily bring the maximum figure and there is not much obtainable under $19. There is considerable tonnage on the way and at least two cargoes now loading. Los Angeles has taken large quantities of coke recently and there are good indications for additional business in that section of the State. Prices there are a little lower than the quoted rates in this market. A number of orders are already booked for third quarter delivery.

Old Material.—Sales drag rather heavily and the same dullness which has prevailed for several weeks still continues with very little indications of change in sight. While prices are quotably the same as two weeks ago, buyers are taking even more sparingly than then. For the heavy melting steel, $13 to $13.50 is still the asking figure on round lots. For second and other lower grades of scrap, the market is weak and prices unsteady, in fact, almost nominal. Reports from Los Angeles show a little better tone there, with consumers taking more freely than a month ago and prices slightly lower than in this city.

Industrial Engineers Hold Eighth Annual Convention at Buffalo

The eighth annual convention of the Society of Industrial Engineers was held at the Hotel Statler, Buffalo, April 30, May 1 and 2.

The major subject was "Reducing the Cost of Business." An address was made on what is needed from the management point of view, and papers were presented on reducing the cost of selling, reducing costs through industrial engineering, reducing costs through cooperative research work, reducing the cost of manufacture and reducing cost through the personnel manager.

Three simultaneous debates of production managers, accountants and personnel groups, respectively, was a feature.

A report of the convention will be published in THE IRON AGE of May 15.

Youngstown Scrap Market

YOUNGSTOWN, May 6—The scrap market in the Mahoning Valley is sentimentally firmer, at least, though business continues to be very inactive. The heavy melting scrap market remains at $15 minimum, but one of the principal purchasing interests in the Valley voices the opinion that a firm order involving any sizable tonnage could hardly be placed under $16.

Hydraulically compressed steel maintains the usual differential and is quotable from $13.50 to $14.

Melters are watching the market developments closely but are doing little current buying.

Detroit Scrap Market

DETROIT, May 6.—Melters expect increases in releases after the middle of the month, although automotive lines are still slack due to present inventories at manufacturers' plants. Prices are the same as quoted a week ago.

FABRICATED STEEL BUSINESS

Bookings of 19,000 Tons and Fresh Inquiries of 13,000 Tons

Neither in bookings nor in new projects appearing for bidding was the week as good as last week. Awards totaled 19,000 tons for the larger size jobs and to the pending list was added 13,000 tons. Continued high costs of building trades labor and of building costs in general are being carefully considered in investment enterprises, as indicated by the postponement of the Statler Hotel project in Boston, and a strike of structural workers in New York is expected to have a temporarily deterrent effect. Railroad bridge work is noteworthy and railroad earnings are counted on to bring out bridge work for some months. Though not large individually, a large total in the aggregate is looked for. Awards include:

Theater, Mt. Vernon, N. Y., 300 tons, to George A. Just Co.

Storage sheds for the Commonwealth of Pennsylvania, 650 tons, to the Maryland Metal Building Co.

First National Bank Building, New Bedford, Mass., 750 tons, to an unnamed fabricator.

Frank & Seder, Market Street, Philadelphia, store addition, 1200 tons, to Belmont Iron Works.

Public Service Commission of New Jersey, generator house, Harrison, 500 tons, to an unnamed fabricator.

Chesapeake & Ohio Railroad, bridges, 400 tons, to unnamed fabricator.

Paterno apartment, 115th Street and Riverside Drive, New York, 2000 tons, to Paterson Bridge Co.

Department store, Bronx Borough, New York, 700 tons, to Hinkle Iron Co.

Office building, Eighth Avenue, New York, 300 tons, to Easton Structural Steel Co.

Garage, Ninetieth Street, New York, 250 tons, to Harris Structural Steel Co.

Apartment house, Park Avenue, New York, 500 tons, to Harris Structural Steel Co.

Office building, West Twenty-ninth Street, New York, 700 tons, to Harris Structural Steel Co.

Apartment, Fifteenth and Walnut Streets, Philadelphia, 1500 tons, to Belmont Iron Works.

Ford Motor Co., assembly plant, Dallas, Tex., 1700 tons, to Kansas City Structural Steel Co.

Standard Oil Company of Indiana, 4 tanks at Whiting, Ind., and 1 at Detroit, 1500 tons, to Chicago Bridge & Iron Works.

Sinclair Refining Co., 75 small tanks, 500 tons, divided between Graver Corporation and James G. Heggie & Sons.

Davis Welding & Mfg. Co., Cincinnati, new plant, 400 tons, to L. Schreiber & Sons.

McCrory Stores Corporation, store at Dayton, Ohio, 400 tons, to J. E. Moss Iron Works Co.

Southwestern Portland Cement Corporation, new plant at Dayton, 1400 tons, to Dayton Structural Steel Co. and Burger Iron Works.

E. I. du Pont de Nemours & Co., fibre silk mill at Nashville, Tenn., 1400 tons, to Ingalls Iron Works Co., Birmingham.

Tribune building, Tampa, Fla., 700 tons, to Lukens Steel Co.

U. S. Engineers' Office, Louisville, Ky., 5 steel maneuver boats and derricks, 200 tons, Charles Hedgewald Co. and American Hoist & Derrick Co., low bidders.

Tomahawk Avenue bridge, Tomahawk, Wis., 380 tons, to Wausau Iron Works.

Physicians Land Co., building, Schenley Farms, Pittsburgh, 150 tons, to Jones & Laughlin Steel Corporation.

Industrial Arts Building, West Springfield, Mass., 470 tons, to American Bridge Co.

Zolte furniture warehouse, Buffalo, 170 tons, to R. S. McMannus Steel Construction Co.

State School for Mental Defectives, Rome, N. Y., 100 tons, to Kellogg Structural Steel Co.

National Chautauqua County Bank, Jamestown, N. Y., 100 tons, to Kellogg Structural Steel Co.

Carlisle Department Store, Ashtabula, Ohio, 200 tons, to H. L. Thomas.

W. E. Wood Co., Detroit, warehouse, 140 tons, to Whitehead & Kales Co.

The White Motor Co., Cleveland, factory building, 250 tons, to Moss Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Lehigh Valley Railroad, bridges, 200 tons, bids in.

War Department, three bridges for Chesapeake & Delaware Canal, 3000 tons (more bridge work to come later).

New York Transit Commission, Bronx, 1400 tons.

Central Railroad of New Jersey, bridge at Allentown, Pa., 800 tons.

Telephone building, Philadelphia, 600 tons.

Hospital, Mt. Vernon, New York, 250 tons.

Florida East Coast Railroad, three bridges, 1300 tons.

Chicago, North Shore & Northern, bridge work, 1900 tons.

Diversey Theater, Chicago, 500 tons.

Continental National Bank, Indianapolis, 600 tons, bids being taken.

Standard Sanitary Mfg. Co., Louisville, Ky., foundry addition, estimated 500 tons, bids to be asked shortly, Joseph & Joseph, architects.

Val Antonio office building, Tampa, Fla., approximately 1400 tons, bids close May 15.

Revere, Mass., Union high school, 100 tons.

B. F. Perkins & Sons, Willimansett, Mass., plant addition, 150 tons.

Cutler Hotel and Turkish bath house, Cleveland, 400 tons.

Mahoning Bank, Youngstown, 725 tons, bids taken.

Moose club house, Ashtabula, Ohio, 100 tons.

RAILROAD EQUIPMENT BUYING

New Business Still Light—Orders for Only 65 Locomotives

New business for both locomotives and cars continues meager. The award of 65 engines to the Brooks Locomotive Co. constitutes the new business. Only 100 freight cars have been inquired for, with the possibility of 8000 cars being under negotiation in the near future. An inquiry for 1000 steel underframes is before the market.

Class One railroads on April 15 had 176,698 freight cars in need of repair or 7.8 per cent of the cars on line, according to the car service division of the American Railway Association. This was an increase of 3951, compared with the number in need of such repair on April 1.

On April 15 the roads also had 12,144 locomotives in need of repair or 18.8 per cent of the number on line, according to the same reports. This was an increase of 586 locomotives over the number in need of such repair on April 1.

The Brooks Locomotive Co., Dunkirk, N. Y., will build 65 engines for the Union Pacific, New York Central and Rock Island. It is believed part of the order for 100 locomotives for the Chesapeake & Ohio will be sent from the Richmond plant to Dunkirk.

The Baltimore & Ohio is expected to enter the market shortly for 8000 freight cars, including 5000 100-ton all-steel hopper cars.

The Florida East Coast is inquiring for 100 ballast cars.

The New York Rapid Transit is inquiring for 75 underframes.

The Richmond, Fredericksburg & Potomac is in the market for 3 express cars and 2 coaches.

The Wabash is inquiring for 200 center-sill reinforcements.

The New York, New Haven & Hartford is in the market for 3 multiple unit passenger cars.

Swift & Co., Chicago, are inquiring for 1000 steel underframes.

American Iron and Steel Institute Meeting

At the annual meeting of the American Iron and Steel Institute held in New York, May 5, the following directors whose term had expired were reelected: James A. Burden, James A. Campbell, Thomas Cantley, Thomas K. Glenn, Eugene G. Grace, Severn P. Ker, William A. Rogers, Jesse F. Welborn.

The general meeting of the institute, at which Judge Gary will deliver an address, to be followed by the reading of papers, will be held Friday, May 23, at the Hotel Commodore, with the usual banquet in the evening.

Fire Started by By-Product Ovens

YOUNGSTOWN, May 6—Fire has been started under the 47 by-product coke ovens being erected at Warren, by the H. Koppers Co., in connection with the blast furnace of the Trumbull Cliffs Furnace Co. Nearly 500 men are employed in construction. Coke will not be produced, however, for about two months.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.20c. to 2.30c.

Structural Materials

Beams, channels, etc., base, per lb.....2.25c. to 2.35c.
Sheet piling .....2.35c. to 2.50c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.25c. to 2.30c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.30c. to 2.40c.
Refined iron bars, base, per lb.....3c.
Double refined iron bars, base, per lb.....4.75c.
Stay bolt iron bars, base, per lb.....6.50c. to 7.00c.

Hot-Rolled Flats

Hoops, base, per lb.....2.75c. to 2.90c.
Bands, base, per lb.....2.75c. to 2.90c.
Strips, base, per lb.....2.75c.

Cold-Finished Steel

Bars and shafting, base, per lb.....3c.
Bars and shafting, l.c.l., per lb.....3.25c.
Bars, S. A. E. Series, No. 2100.....4.75c.
Bars, S. A. E. Series, No. 2300.....6.25c.
Bars, S. A. E. Series, No. 3100.....5.25c.
Strips, base, per lb.....4.50c. to 5.00c.

Wire Products

(To jobbers in car lots)

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in..... 2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....$2.75
Annealed fence wire, base, per 100 lb..... 2.90
Spring wire, base, per 100 lb..... 3.70
Galvanized wire No. 9, base, per 100 lb..... 3.35
Galvanized barbed, base, per 100 lb..... 3.80
Galvanized staples, base, per keg..... 3.80
Painted barbed wire, base, per 100 lb..... 3.45
Polished staples, base, per keg..... 3.45
Cement coated nails, base, per count keg.....$2.50 to 2.60
Bale ties, carloads to jobbers.....75 and 2½ per cent off list
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10, 10 and 10 per cent off list
Machine bolts, all sizes, cut threads,
60, 10 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads,
60, 10 and 10 per cent off list
Carriage bolts, cut threads, all sizes...60 and 10 per cent off list
Lag bolts .....65, 10 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,
50, 10 and 10 per cent off list
Larger and longer sizes.....50, 10 and 10 per cent off list
Hot pressed squares or hex. nuts, blank....4.75c. to 5c. off list
Hot pressed nuts, tapped.....4.75c. to 5c. off list
C.p.c. and t. square or hex. nuts, blank.....4.25c. to 4.50c.
C.p.c. and t. square or hex nuts, tapped.....4.25c. to 4.50c.
Semi-finished hex. nuts:
⅜ in. and smaller, U. S. S.....80, 10 and 5 per cent off list
⅝ in. and larger, U. S. S.....75 and 10 per cent off list
Small sizes, S. A. E.....80, 10, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75, 10 and 5 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Bolt ends with cold pressed nuts.....50 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
50 to 55 and 5 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
65 and 5 to 70 and 10 per cent off list
Washers .....5c. to 5.25c. off list
Lock washers .....80 per cent off list

Semi-Finished Castellated and Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000			Per 1000	
	S. A. E.	U. S. S.		S. A. E.	U. S. S.
¼-in.	$4.25	$4.25	5/16-in.	$13.25	$13.50
5/16-in.	4.90	4.90	⅜-in.	16.25	16.50
⅜-in.	5.90	6.25	7/16-in.	22.50	23.00
7/16-in.	7.50	8.50	½-in.	34.00	34.00
½-in.	9.75	10.00	1-in.	53.00	55.00

Larger sizes—Prices on application.

Cap and Set Screws

Milled hex. head cap screws.....75, 10 and 5 per cent off list
Milled standard set screws, case hardened,
75, 10 and 5 per cent off list
Milled headless set screws, cut thread,
75, 10 and 5 per cent off list
Upset hex. head cap screws, U. S. S. thread,
80, 10 and 10 per cent off list
Upset hex. head cap screws, S. A. E. thread,
80, 10 and 10 per cent off list
Milled studs .....65 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb..$2.65 to $2.75
Small rivets .....70 and 10 per cent off list

Track Equipment

Spikes, ⅝ in. and larger, base, per 100 lb.....$2.90 to $3.00
Spikes, ½ in. and smaller, base, per 100 lb.... 3.25 to 3.40
Spikes, boat and barge, base, per 100 lb..... 3.25 to 3.40
Track bolts, ¾ in. and larger, base, per 100 lb.. 4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb... 4.50 to 5.00
Tie plates, per 100 lb..... 2.55
Angle bars, base, per 100 lb..... 2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ¾	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1¼	30	14

Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discount of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn			
1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1¾ in.	31	4 in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2¾ in.	32		

Hot Rolled

3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in.	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....85 per cent off list
Carbon 0.30 to 0.40, base.....83 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage	15	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1½-in. O.D. 9 gage	15
2¼-in. O.D. 12 gage	17	5¾-in. O.D. 9 gage	55
2¼-in. O.D. 11 gage	18	5½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base $11.00	20-lb. coating I. C....$14.90
8-lb. coating I. C.... 11.80	25-lb. coating I. C.... 16.20
12-lb. coating I. C.... 12.70	30-lb. coating I. C.... 17.35
15-lb. coating I. C.... 13.95	35-lb. coating I. C.... 18.35
	40-lb. coating I. C.... 19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.80c. to 3c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.50c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb., 5.10c.

Galvanized

No. 28 (base), per lb.....4.80c. to 5c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$5.65
Old range non-Bessemer, 51½ per cent iron	4.90
Mesabi Bessemer, 55 per cent iron	5.40
Mesabi non-Bessemer, 51½ per cent iron	4.75

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11.00c.
Iron ore, Swedish, average 66 per cent iron	9.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	45c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	42c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.75 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	19.00 to 22.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$107.50
Ferromanganese, British, 80 per cent f.o.b. Atlantic port, duty paid	107.50
Ferrosilicon, 50 per cent, delivered	75.00
Ferrosilicon, 75 per cent	140.00
Ferrotungsten, per lb. contained metal	90c. to 93c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	10.75c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	10.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent.....$36.00 to $37.00
Spiegeleisen, domestic, 16 to 19 per cent..... 35.00 to 36.00
Ferrosilicon, Bessemer, 10 per cent, $41.50; 11 per cent, $44; 12 per cent, $46.50; 14 to 16 per cent (electric furnace), $40.00.
Silvery iron, 5 per cent, $29.00; 6 per cent, $30.00; 7 per cent, $31.00; 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39.00; 12 per cent, $41.50.

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$20.00 to $22.00	
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	22.00 to 23.50	
Per 1000 f.o.b. works:		
Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00
Maryland	47.00	42.00
Ohio	42.00 to 43.00	37.00 to 39.00
Kentucky	42.00 to 43.00	37.00 to 39.00
Illinois	——	37.00 to 42.00
Missouri	42.00 to 45.00	35.00 to 40.00
Ground fire clay, per net ton		6.00 to 7.00
Silica Brick:		
Pennsylvania		38.00 to 40.00
Chicago		49.00
Birmingham		50.00
Ground silica clay, per net ton		8.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		47.00

Semi-Finished Steel, F.O.B. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00
Rolling billets, 2-in. and under	40.00
Forging billets, ordinary carbons	45.00
Sheet bars, Bessemer	41.00
Sheet bars, open-hearth	41.00
Slabs	40.00
Wire rods, common soft, base, No. 5 to ⅜-in.	51.00
Wire rods, common soft, coarser than ⅜-in.	$2.50 over base
Wire rods, screw stock	$5.00 per ton over base
Wire rods, carbon, 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	2.25c.
Skelp, sheared, per lb.	2.25c.
Skelp, universal, per lb.	2.25c.

Finished Iron and Steel, F.O.B. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, lb.	2c.
Rails, light, rerolled, base, per lb.	1.85c. to 1.90c.
Spikes, ⅜-in. and larger, base, per 100 lb.	$2.90 to $3.00
Spikes, ½-in. and smaller, base, per 100 lb.	3.25 to 3.40
Spikes, boat and barge, base, per 100 lb.	3.25 to 3.40
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.50 to 5.00
Track bolts, ⅝-in. and larger, base, per 100 lb.	4.00 to 4.25
Tie plates, per 100 lb.	2.55
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.30c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rail steel reinforcing, base, per lb.	2.10c. to 2.15c.
Rail steel bars, base, per lb., Chicago mill	2.20c.
Cold finished steel bars, base, Chicago, per lb.	3c.
Ground shafting, base, per lb.	3.40c.
Cut nails, base, per keg	$3.00 to $3.15

Alloy Steel

S. A. E. Series Numbers	Bars 100 lb.
2100*(1¼% Nickel, 10 to 20 per cent Carbon)	$3.50
2300 (3½% Nickel)	5.00
2500 (5% Nickel)	$6.50 to 7.00
3100 (Nickel Chromium)	4.00
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75
5200*(Chromium Steel)	7.50 to 8.00
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel)	4.50 to 4.75
9250 (Silicon Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	4.75
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.75 to 5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton prices for bars of same analysis. On smaller than 4 x 4-in. billets the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, carload lots, 36,000 lb. minimum carload, per 100 lb.:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43	*Pacific Coast	$1.15
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735	*Pac. Coast, ship plates	1.20
Baltimore, domestic	0.31	Cleveland, Youngstown		Kansas City (pipe)	0.705	Birmingham	0.58
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.60	Memphis	0.56
New York, domestic	0.34	Detroit	0.29	Omaha	0.735	Jacksonville, all rail	0.70
New York, export	0.255	Cincinnati	0.29	Omaha	0.705	Jacksonville, rail and water	0.415
Boston, domestic	0.365	Indianapolis	0.31	*Denver	1.15	New Orleans	0.67
Boston, export	0.255	Chicago	0.34	†Denver (pipe)	1.17		

*Applies minimum carload 80,000 lb. †Minimum loading 46,000 lb.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingots and muck bars, structural steel, common wire products, including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All rates per 100 lb. in carload lots, minimum 36,000 lb.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin (Spot)	Lead		Zinc	
April	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
30.....	13.50	13.12½	47.80	7.87½	7.60	6.25	5.90
May							
1.....	13.50	13.00	48.00	7.87½	7.60	6.15	5.80
2.....	13.50	13.00	48.50	7.87½	7.55	6.17½	5.82½
3.....	13.50	13.00	....	7.87½	7.55	6.17½	5.82½
5.....	13.50	13.12½	48.12½	7.75	7.50	6.20	5.85
6.....	13.50	13.12½	47.50	7.75	7.50	6.17½	5.82½

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, May 6.

Buying of copper has improved, but other markets are still quiet and lower. Demand for tin is spasmodic even at lower prices and there is very little life to either the lead or zinc markets, which are again lower.

Copper.—Electrolytic copper fell as low as 13.25c., delivered, in the past week and this caused the entrance into the market of a few large buyers. While no buying movement may be said to have started, transactions have involved several million pounds, the total variously estimated as high as 20,000,000 lb. Inquiries continue in moderate volume and the interest of consumers is a little better than it has been in some time. The foreign market, however, continues under the influence of the same speculative situation as described last week and prices are a little lower than for domestic account. The net result of the present situation is a firmer tone and a slight advance of the minimum price to 13.37½c., delivered, with several large sellers out of the market at this price. Some of these are quoting as high as 13.62½c., or refuse to quote at all. Evidently the expectations are that prices will advance rather than otherwise. Lake copper is quoted at 13.50c. to 13.62½c., delivered.

Copper Averages.—The average price of Lake copper for the month of April, based on daily quotations in THE IRON AGE, was 13.66c. The average price of electrolytic copper was 13.45½c., delivered, or 13.20½c., refinery.

Tin.—Sales of Straits tin for the week covered by this report were 1100 to 1200 tons. About 350 tons of this was sold on April 30 and 300 on May 2 and another 300 yesterday, with a moderate business done today. Sentiment both in London and here was considerably better on May 2 than in some days. The most interesting feature of the market is the statistical position and it is pointed out that, whereas for the next two months consumption should average about 6500 tons per month, only about 9000 tons is indicated as likely to be available. As a consequence, it has already developed that a drawing on supplies in London has been necessary and that this has been daily taking place. As a result the spot situation is expected to be acute later. Already there is a premium on spot over futures, yesterday spot metal having sold at 48c., with futures at 47c., whereas only a few days ago they were on a parity. Spot Straits tin was quoted today in New York at 47.50c., with the London quotations about £7 per ton less than a week ago, spot standard being quoted at £233 10s., future standard at £233 5s. and spot Straits at £235 5s. Statistics for April show that arrivals of tin during the month are 10,110 tons, with deliveries of 7590 tons into consumption. Stocks on April 30 are reported as 392 tons, with 3930 tons landing.

Lead.—The American Smelting & Refining Co. reduced its contract price yesterday, May 5, from 8c. to 7.75c., New York. Some business has been done at the same level in the outside market, although one seller quotes 7.50c., New York, and 7.35c., St. Louis. Generally the market is exceedingly dull. The decline in London has been fairly continuous and has consequently been a factor in this market.

Zinc.—Weakness in prime Western has continued to develop and the market is considerably lower than a week ago with the quotation for 30 days ranging between 5.80c. and 5.85c., St. Louis, or 6.15c. and 6.20c., New York. Only a very moderate business is reported with interest on the part of consumers at a low ebb.

Nickel.—Quotations for shot and ingot nickel are unchanged at 27c. to 32c. per lb., with electrolytic nickel held at 30c. to 32c. by the leading producers. In the outside market both shot and ingot nickel are quoted at 28c. to 32c. per lb.

Antimony.—The easier tendency continues with Chinese metal quoted as low as 8.50c., duty paid for shipment in May or June. The spot and nearby market in New York is nominal at 8.70c. to 8.80c., with no interest on the part of consumers.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 27c. to 28c. per lb., duty paid, delivered.

Old Metals.—The few orders on the market are for immediate requirements only. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.75
Copper, heavy and wire	12.00
Copper, light and bottoms	11.00
Heavy machine composition	10.75
Brass, heavy	8.25
Brass, light	6.75
No. 1 red brass or composition turnings	9.25
No. 1 yellow rod brass turnings	7.75
Lead, heavy	6.75
Lead tea	5.50
Zinc	4.50
Cast aluminum	16.00
Sheet aluminum	16.50

Chicago

MAY 6.—Tin, lead, zinc and antimony have declined in a quiet market. Fair quantities of copper and tin have been sold at concessions. Among the old metals grades of zinc and tin have declined. We quote in carload lots: Lake copper, 13.75c.; tin, 49.50c.; lead, 7.65c.; spelter, 5.95c.; antimony, 11c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9c.; red brass, 8.50c.; yellow brass, 6.75c.; lead pipe, 6c.; zinc, 3.75c.; pewter, No. 1, 27c.; tin foil, 30c.; block tin, 36c.; all buying prices for less than carload lots.

Mechanical Engineers' Spring Meeting

In addition to those listed in THE IRON AGE of April 3, page 1000, the following papers will be presented at the meeting of the American Society of Mechanical Engineers, to be held in Cleveland, May 26 to 29.

Machine Shop Practice Division.—"Limiting Cases in Involute Spur Gearing," by A. B. Cox, Wilkinsburg, Pa. "The Sine Bar as a Universal Planing Gage," by R. H. Rausch, Niles-Bement-Pond Co., Plainfield, N. J.

Machine Shop Practice and Ordnance Divisions.—"Interchangeable Manufacture of U. S. Army Rifle Bolt." "Analysis of a Machine Shop Problem on a Quantity and Final Economy Basis," A. L. De Leeuw, New York.

Railroad Division.—"Recent Developments in Heavy Electric Locomotives," N. W. Storer, Westinghouse Electric & Mfg. Co., East Pittsburgh; W. B. Potter, General Electric Co., Schenectady.

Management Division.—"The Measurement of the Quality of Product," by G. W. Radford, New York. "The Control of Idle Equipment," by W. L. Conrad, New York. There will also be a topical discussion on the measurement of the cost accounting function.

A central feature of the program is the industrial preparedness dinner to be held May 28, at which addresses will be made outlining the War Department's plans for cooperation with industry.

The Momsen-Dunnegan-Ryan Co., El Paso, Texas, wholesale dealer in hardware, mill and mining supplies, has let the contract for a warehouse to be constructed at Phoenix, Ariz. The new building will be 90 x 125 ft., two stories, and of reinforced concrete construction. Direct factory shipments will be made to this branch plant for distribution in Arizona territory. The head offices of the company will be maintained at El Paso as heretofore.

PERSONAL

Charles H. Forster, treasurer Superior Steel Corporation, Pittsburgh, has resigned, effective May 10, to become general manager of sales of the Morris & Bailey division, Oliver Iron & Steel Corporation, Pittsburgh. He will make his headquarters at Wilson, Pa., where the Morris & Bailey plant is located, and will assume his new duties June 1, next. Mr. Forster became associated with the Superior Steel Corporation in 1917 as controller, later that year becoming secretary-treasurer. He relinquished the office of secretary in 1919. His new position will not be strange to him, as he has had intimate contact with the sales department of the Superior Steel Corporation throughout the period of his connection with that company. Before making that connection, Mr. Forster was assistant secretary for 16 years of the American Iron & Steel Mfg. Co., Lebanon, Pa., which was absorbed by the Bethlehem Steel Co.

C. H. FORSTER

Ralph McCarty, formerly president of the Corr Construction Co., and treasurer of the Corrugated Bar Co., who retired from these positions to become managing director of the Buffalo Athletic Club, has been named president of the Buffalo Rotary Club, and William Houck, president Buffalo Structural Steel Co., has been named vice-president of the Rotary Club.

Roy H. Davis has resigned as a director and general manager of the Firth-Sterling Steel Co., McKeesport, Pa., and also as vice-president and a director of the Globe Wire Co., owned by the Firth-Sterling company. He is, however, continuing his association as a director of Thos. Firth & Sons, Inc., Hartford, Conn. Mr. Davis has been associated with the Firth-Sterling Steel Co. since 1917. Last fall he spent several months at the works of Thos. Firth & Sons, Ltd., Sheffield, England, making a special study of stainless steel and its application for engineering purposes, especially turbine plates. He also has been in close touch with its development in this country. Previous to his association with the Firth-Sterling Steel Co., Mr. Davis was with the Washington Steel & Ordnance Co., a Firth company, in charge of munition work, having been located at the office in New York. He has made no definite plans for the future.

At the annual meeting of the stockholders of the Firth-Sterling Steel Co., held April 29, the following directors were reelected: Lewis J. Firth, president; Eben B. Clarke, vice-president; D. E. Jackman, treasurer; L. Gerald Firth and Thomas D. McCloskey. E. D. Gray was reelected secretary.

Roger Birdsell, formerly connected with the Bureau of Standards at Washington, is now connected with the Racine Radiator Co., Racine, Wis., as sales engineer.

George Furman, sales manager Beardsley & Piper Co., Chicago, will deliver an address illustrated by motion pictures, on the sand slinging machine, Monday evening, May 12, before the Chicago Foundrymen's Club. The meeting will be held at the City Club, Chicago.

Theodore C. Wilson, for the last 12 years associated with J. O. Henshaw, Boston, dealer in pig iron, became associated with E. Arthur Tutein, Inc., Boston, effective May 1, and will make his headquarters in that city.

John B. Curtis, mechanical engineer with the Remington Arms Co., Bridgeport, Conn., has been made a trustee of the bankrupt estate of the Arnold Co., Inc., founder, Norwalk, Conn.

A. J. Brandt has resigned as general manager of the Janesville, Wis., division, Fisher Body Corporation, to accept the management of the Pacific Malleable Co., Oakland, Cal., the new Western branch of the Forbes Malleable Co., Rockford, Ill. He formerly was associated in engineering capacities with the Du-Pont Engineering Co. and the Samson Tractor Co., Janesville.

A. C. Rinker has been appointed general superintendent of the Superior, Wis., locomotive and car repair shops of the Great Northern Railway, succeeding M. J. Stoll, who has retired from active business. Mr. Rinker has been in charge of the Great Northern shops at Devils Lake, N. D., for four years.

Duncan W. Fraser and Joseph B. Ennis have been elected directors of the American Locomotive Co. to fill vacancies. Mr. Fraser is vice-president in charge of manufacturing and sales, and Mr. Ennis is vice-president in charge of engineering.

I. Edmund Waechter has resigned as metallurgical engineer with the Brown & Sharpe Mfg. Co., Providence, R. I., and now is connected in a similar capacity with the General Chemical Co., 40 Rector Street, New York.

Austin M. Mueller, general manager of sales of Joseph T. Ryerson & Son, Inc., Chicago, was the guest of honor at a dinner in Chicago on April 26, tendered by his associates to commemorate the completion of 25 years with the company. Mr. Mueller, who has a wide acquaintance in the steel trade, rose from the ranks, and enjoys large popularity. A beautiful gift was presented him.

A. M. MUELLER

Charles D. Harrington, for many years president of the Harrington Cutlery Co., Southbridge, Mass., has retired and transferred his holdings to other stockholders of the company. He has confined himself to the supervision of the business continuously for 22 years during his 45 years connection with the company and, while he will continue to be identified with the company and devote part of his time to its affairs, Mr. Harrington plans to take more time for recreation and travel.

George C. McMullen, formerly manager of sales of the industrial bearings division, Timken Roller Bearing Co., has been made district manager of sales on the Pacific Coast, with headquarters at San Francisco. Harry H. Gildner, formerly in charge of the Chicago office, becomes manager of the industrial division, with headquarters at Canton, Ohio.

C. A. Barnes has resigned from the Perry-Buxton-Doane Co., Boston, to assume management of the Steel Scrap Co., Philadelphia.

Charles R. Delong, formerly secretary of Davis Bros., Inc., spike manufacturers, Philadelphia, has resigned and left for a trip to the Pacific Coast. He was associated with Davis Bros. for 27 years.

Howard U. Herrick, for the past five years factory manager of the Brown-Lipe Gear Co., Syracuse, N. Y., has been elected vice-president and general manager of the V & O Press Co., Hudson, N. Y.

William R. Wallis, for 12 years a representative of the *American Machinist*, New York, has joined the staff of the *American Exporter* as special representative, with headquarters in New York.

C. O. Drayton, assistant sales manager of the Graton & Knight Mfg. Co., maker of leather products, Worcester, Mass., is making an extensive business trip through the South and Southwest.

OBITUARY

Albert Ladd Colby

Albert Ladd Colby, for many years an important figure in American iron and steel metallurgy, died at Torquay, England, on April 30, from influenza contracted in London several weeks ago. Mr. Colby was born in New York, June 26, 1860. His education was obtained in the New York public schools, the College of the City of New York and Columbia University. He was graduated from Columbia with the degree Ph.B. in 1881. He engaged at once as mining engineer and since 1886 had specialized in the metallurgy of steel. He was iron and steel commissioner of the Louisiana Purchase Exposition at St. Louis in 1904. For many years he was attached to the faculty of Lehigh University at Bethlehem, Pa. For a number of years after 1897 he was secretary of the Association of American Steel Manufacturers, which represented the first successful effort to standardize specifications for finished steel. Mr. Colby also will be remembered for many contributions to technical publications and for volumes on heat treatment of forgings, on reinforced concrete, alloy steels and standard specifications in the manufacture of steel. The last named was published in 1902 and consisted of a review and text of American Standard Specifications for steel adopted in August, 1901, by the American section of the International Association for Testing Materials. During the World War Mr. Colby was commissioned abroad by the Government to work on the standardization of aircraft steels. One of his European investigations and reports of some years ago was on the various systems of by-product coke ovens.

ALBERT L. COLBY

Mr. Colby was a member of the American Chemical Society, American Institute of Mining Engineers, Society of Chemical Industry (London), American Society of Mechanical Engineers, International Association for Testing Materials, Franklin Institute, Iron and Steel Institute (London), American Society of Civil Engineers, Engineering Society of Western Pennsylvania, American Iron and Steel Institute and other societies.

HENRY MALISON BYLLESBY, head of the bond and engineering house of Byllesby & Co., Chicago, promoter of public utilities, died in Chicago, May 1, of heart disease, aged 65 years. Despite his age he served during the World War as general purchasing agent for the American Expeditionary Forces and was stationed in London. When discharged in 1918, he was awarded the Distinguished Service Order by the British Government, and later received the American Distinguished Service Medal. He was a member of the American Society of Civil Engineers and the American Society of Mechanical Engineers.

EDWARD MARX, head of the firm of A. Marx & Sons, dealers in machinery and metals, New Orleans, died April 23. Mr. Marx also was president of the Equitable Equipment Co., New Orleans, and during his connection of more than 30 years with the machinery, metals and railroad accessory lines, made wide acquaintance both in this country and abroad.

FRANK LENAHAN, head of Lenahan & Son, dealers in iron and steel scrap, 53 Fulton Street, Buffalo, died April 19 at his home, 162 Summit Avenue, that city, aged 73 years. Mr. Lenahan came from Ireland at the age of 12 and engaged in the carting business until he was 18, when he founded the scrap business which bears his name. He retired from active connection with the firm six years ago.

XEN FAGAN, Buffalo, manager of the Niagara Falls, Ont., plant of the Ontario Insulator Wire Co., was killed when his automobile was struck by a locomotive at a crossing in North Tonawanda, N. Y., April 30.

JOSEPH R. JACKSON, SR., a pioneer in the steel industry, died April 30, at his home in Brookline, Mass., in his eighty-seventh year. For many years his interests were in Pittsburgh, but subsequently he lived in New York. He was president for ten years of the National Tube Works. Thirty years ago Mr. Jackson retired from business and at that time moved to New York. His grandfather was one of the original iron men in the eastern part of the country.

Reduced Demand for Steel Products from Automotive Companies

YOUNGSTOWN, May 6—Though common sheets have been sold in this district below 3.60c. for No. 28 gage, the bulk of the black sheet tonnage has moved at prices ranging from 3.70c. to 3.75c. Mills are obliged to bid sharply, however, to secure any of the going tonnage. The smaller rolling interests are doing better proportionately than the larger makers due to their greater flexibility in market conditions such as now prevail. Current business is being fairly well distributed among the various Valley interests, and involves chiefly small-lot tonnages. So close are mills running, however, that it is often impossible to make up production schedules for the week, until Saturday of the the previous week.

Business in rolled products going directly or indirectly to the automotive industry is characterized as decidedly spotty and lacking strength. This is indicated by the experience of a Valley independent full-finished sheet producer, which reports the receipt in one week recently of a tonnage volume equivalent to its shipping orders for the preceding three-weeks' period.

Plate and bar tonnage with the independents has declined appreciably within the past month, as indicated by the low production rate, which has been reduced to the volume of incoming tonnage.

Some of the current Valley plate mill output is going into skelp, for the tube mills.

Plans of American Roll & Machine Co.

Owing to the large number of rolling mills in the Youngstown district, the American Roll & Machine Co. has decided to locate its plant and establish its central headquarters in Warren, Ohio. A site is now under selection and work of constructing a plant will go forward without delay. The company is capitalized at $300,000, of which a considerable portion has been subscribed.

It will manufacture chilled cast iron rolls for use in sheet and tin mills, strip, plate, rod and wire mills, as well as other rolling mill equipment.

J. C. Manternach of Canton is president of the company; J. B. Estabrook, Warren, is vice-president, and R. E. Shook of Canton is secretary-treasurer.

Blast Furnace Blown Out

YOUNGSTOWN, May 6—No. 2 blast furnace in the group at Farrell, Pa., of the Carnegie Steel Co., suspended recently for repairs, has been blown out. Numbers 1 and 3 stacks in the same complement will be suspended at an early date. These suspensions will reduce the active blast furnaces in the Youngstown district to 22 of 45, the first time in over a year the number has dropped below the half way mark.

Further Advances in Gear Standardization

(*Continued from page* 1367)

involving high-grade alloy steels, heat treatment, etc.

The accomplishments of the A. G. M. A. in its standardization work and in other ways was cited as permitting of greater service to customers, this being said to be realized by few outside of the gear industry.

It was reiterated that possibly it was the gear makers fault if the users of gears haven't been persuaded of the advantages of shifting to a reliable gear manufacturer the responsibility for seeing that they get gears that will perform with maximum efficiency in their equipment and often increase the value of their product, relieving them at the same time of considerable worry and detail.

"Apparently there is no question about the need of the gear manufacturers," said Mr. Hewin, but as there is grief enough in the gear business without guessing at anything, we do need to be more thorough if we are to benefit by the opportunities that exist for being of constructive service. Let us try to analyze our customer's needs more thoroughly, even help them plan their production schedule, if necessary. In this way we not only give the customer better gears, when he wants them, and save him money, but secure for ourselves the confidence of the manufacturers—who need us and a better balanced production."

Knowledge of Costs a Necessity

Because the field of competition in the gear industry is so vast and the intricacies so numerous and varied, the executive must of necessity have a knowledge of costs, said Russell C. Ball, Philadelphia Gear Works, Philadelphia, in an address on "What Have I Left Out?" or "The Value of Cost Accounting to the Executive."

The possibility of error in quoting was emphasized as due not only to the lack of cost knowledge, but to mistakes made by the estimator, who as a rule figures with the thought that he wants the job, and with favorable conditions in mind. The special nature of the special requirements shown on the customer's prints is often overlooked, he said, when making up the bid.

One of the features emphasized as not to be overlooked in cost accounting is that of general expense, made up of administration and other expenses, which are fixed regardless of shop production. The handling of this item was said to cause, to a great extent, fluctuating prices.

"The adoption of a cost accounting system by any industry," said Mr. Ball, "is a matter of education and a slow process. Some of our members probably will never change their present methods of figuring cost, and prices will continue to fluctuate as necessity or conditions demand; but a cost accounting system, if properly handled, would serve to indicate the probable cost of production and enable the manufacturer to determine the price at which he can sell, or indicate that he cannot compete with prices of articles already established on the market. Every article is manufactured to be sold at a fair profit. This profit is usually fixed by the manufacturer having the most efficient plant and organization, and ignorance of actual cost has led other manufacturers, not so well equipped, to endeavor to compete with them, making the product unprofitable to all."

Cost accounting, he pointed out, will determine the advisability of discontinuing the use of certain old types of machinery in favor of other methods, and acts as a positive check on the efficiency of shop management, for if it appears that orders are costing more to duplicate, the reason for the increase can be easily located and corrected.

Advertising an Investment

What was regarded as a forceful and instructive address was that of J. C. McQuiston, manager of the department of publicity, Westinghouse Electric & Mfg. Co., East Pittsburgh, on "Advertising as an Investment."

"I propose," said Mr. McQuiston, "that we, as gear manufacturers, shall consider advertising as a real bona fide investment, for which we should spend our money as we spend it for tools in our factories. In many respects we might consider advertising as a part of our tool equipment, for it is a very effective tool when properly used."

He discussed the two fundamentals that mark a good investment, safety of capital invested and rate of return on the investment, as applied to advertising. He took up what was necessary to make one's advertising measure up to the requirements of a good investment. To get all the expert advice possible was advocated, and to be a close student of business conditions and to know one's business thoroughly and believe in the business and in its ability to serve, were cited as essentials.

Making plans at least one year in advance was advised, it being important that a complete picture of the advertising possibilities for the whole year be visualized in some graphic form. "Only this procedure," Mr. McQuiston said, "will make it possible to coordinate the various kinds of advertising with the sales efforts of the company so as to bring about maximum efficiency."

It was emphasized as highly important to have a budget, and some definite way of determining the amount to be included. Several methods used in determining the amount were suggested, including a certain percentage of the sales billing during the past year, the percentage of sales expected during the current year, and that of appropriating a flat sum for the purpose. However determined, this appropriation should be known, he said, at the beginning of the year, as it is the basis upon which the plans must be based.

Determining how much of the appropriation should be invested in popular magazines, in the technical trade press, in newspapers, in direct-by-mail campaigns, in catalogs and publications and in miscellaneous forms of publicity was given as the next step. Which of these classes of advertising to use was said to be the individual problem of each advertiser, to be solved only by a study of the particular business.

In connection with determining where the budget is to be invested, it was emphasized as important to choose the right place to advertise. The careful analysis of each periodical was urged, some of the things to consider being circulation, class of readers, relation of advertising to reading matter, and whether the publication is a member of the Audit Bureau of Circulation.

Suggests Increasing Advertising Expenditure

"Some," said Mr. McQuiston, "have done considerable advertising. I would say, however, that you have done very little in proportion to the dynamic force there is in advertising for you in your business. I would say in general our gear manufacturers as a whole could safely experiment by doubling the expenditure for advertising, and by a careful analysis of conditions, invest it very profitably."

In addition to his prepared paper Mr. McQuiston made extempore remarks on various phases of advertising, as related to gear business and in general. As to what percentage of sales should be spent in advertising, he said that where, as in the case of the gear business, personal salesmanship is a large factor, 3 per cent would perhaps be a good figure, this covering advertising and also sales literature.

Mr. McQuiston commended advertising in technical publications and was favorable to direct-by-mail methods. House organs were considered less effective than formerly because there are so many of them. The necessity of keeping mailing lists alive was stressed. It was also emphasized that a fairly constant line of advertising regardless of business conditions was good policy. The proportion of direct mail to trade paper advertising, for a medium size gear plant, was given as about 50-50 per cent.

Buying Habits of Industry Shown Graphically

"The Buying Habits of Industry," an address by Mason Britton, vice-president McGraw-Hill Co., Inc., New York, dealt with fundamental considerations underlying high sales efficiency. These fundamentals

were stated as market determination, buying habits, channels of approach and appeals. Lantern slides showing in graphic form the structure of American business, including the distribution of industries, the buying power of industries in dollars, the buying interrelation of industries and other data were used to illustrate the address. One chart portrayed the relative number of wage earners, clerks and executives and operating staff in various industries.

The results of a recent survey of the buying habits of industry were also presented, one part of the survey being intended to determine who initiates installations of new equipment. The investigaton showed, it was said, that the same men who initiated installations specify the kind of equipment to be purchased, and that the superintendent or works manager or the general manager usually initiated the installation of new equipment. The survey was said also to reveal that 96 per cent of those investigated used industrial and business publications in buying their products. The advertising appeal considered best was said to be that which showed the uses of the product advertised, the next best being the description of installations of the product.

Addresses on Industrial Relations

The practical application of Christianity as the fundamental factor in the solution of industrial relations problems was a main point in an address on "The Management's Responsibility in Industrial Relationship," given by E. S. Sawtelle, Tool Steel Gear & Pinion Co., Cincinnati.

Numerous avenues were said to be available whereby management can get into close contact with employees, gain their confidence and influence them for clean living. The key position of foremen and the desirability of close contact with them was emphasized. That no welfare work or even personal contact will atone for an unjustly slim pay envelope was also stressed.

In a forceful address on the "Seventy-Five Cent Dollar in Business," made at the banquet, S. F. Fannon, Sherwin Service, Inc., made a plea for the cultivation of the good will of employees. Because of the loss of this good will 25 cents in every dollar is lost, he said. It was pointed out that 95 per cent was spent on plant and equipment to every 5 per cent spent in cultivating the cooperation of employees.

Metallography as Used in Everyday Work

"Practical Metallography," defined as that part of the art of macro- or microscopic study of metals that can be used in everyday work, was the subject of an address by Stanley P. Rockwell, consulting metallurgist, Hartford. Its use is generally for purposes of raw and finished material inspection and for finding the sources of troubles and their prevention, its use being practised by those having at least a fundamental knowledge of the manufacture, treatments and general characteristics of the metals involved. It does not involve the care used in preparation or the knowledge required by the research metallographist.

The method of investigation by the metallographist was briefly outlined. Most industries, it was said, simply desire to know whether the material used for the work is satisfactory, and if trouble occurs, why, who is to blame, and how it can be prevented in the future. In the purely metallographic end of his work three aids are at the metallographists disposal.

The first aid is macro examination, which comprises observation of the specimen by the eye alone. This refers to fractures. If this does not disclose anything of an explanatory nature, deep etching may be employed. For this the surface desired is ground on a fine emery wheel and the specimen immersed in acids. The use of silver bromide paper to examine for sulphur segregation is also used.

The second aid is simply a supplement of macro examination and consists in magnifying to a small degree through a suitable microscope, the fractures and etched specimens made as outlined above. Its use is said to be particularly adapted to revealing cracks, seams, etc., and their direction on very highly polished, as well as on less deeply etched, specimens.

The third aid is in the field of higher magnifications where the structures of materials are so magnified as to stand out clearly. By this means many things are determined which are not apparent by the preceding methods, such as impurities in metal, roughly the amounts of the principal elements affecting strength, etc., the heat treatments used, and the quality of these heat treatments being seen. These investigations are applied in general to highly polished and variable etched samples of the work.

Metallographic Inspection of First Importance

From the experience of eight years in the inspection of materials, Mr. Rockwell said that he is convinced that chemical analysis of steel is of less importance to the average plant than is metallographic inspection.

Steel, it was pointed out, is usually purchased to some accepted standard, the A.G.M.A. standards allowing a 0.10 point range in carbon, a 0.30 point range in manganese. There is a strong trend, he said, by the steel producers to widen these ranges. An experienced metallographer can tell, he said, as closely the carbon content, the sulphur and phosphorus contents and the other elements within reason. He can tell the soundness of the steel and whether with proper fabrication and heat treatment it can be made up with a first class article, again he can forecast the best heat treatment for the purpose intended.

A list of the equipment used by the metallographist was given and the qualifications of a man, recruited from the user's plant, to use the equipment was outlined. Slides of several photomicrographs showing the valuable findings of the metallographist were used to illustrate Mr. Rockwell's talk, the findings shown by the slides being discussed in detail.

Metallurgical microscopes of the Bausch & Lomb Optical Co. were shown by I. L. Nixon, of that company.

Application of Spiral Bevel Gears Discussed

An address on the application of spiral bevel gears, by F. E. McMullen, Gleason Works, Rochester, was instructive. Gears of this type have been available for ten years, which is considered sufficient time to provide information from which practical conclusions may be drawn regarding their application.

The necessity of a strong, unflexible mounting was emphasized. Four qualities in which spiral bevels are superior to straight bevels were said to be: Quiet operation at high speeds; higher degree of smooth action at low speeds; great proportional strength; and cheaper quantity production. The adoption of a spiral bevel gear drive was said to be often decided upon by one or more of these qualities.

The first general adoption has been in the automotive field. It was revealed that there are 47 distinct applications in all, including sewing machines, microscopes, phonographs, motor reduction sets and machine tools. It was said that from the number of experimental installations now under way, it appears that the use of straight tooth bevels will be limited to slow moving drives where smoothness is not essential.

A paper on "Gears and Pinions of Equal Strength," by M. A. Durland, assistant professor of machine design, Kansas State Agricultural College, Manhattan, Kansas, was read. In this paper a method is developed for determining the proportion between the addendum and dedendum, for a pair of gears of any given pitch and number of teeth, to obtain pinion and gear teeth of equal strength. The same material is used in both gear and pinion. Following a discussion, the paper was submitted to the tooth form committee for analysis.

British Gear Practice

An address by W. E. Sykes, Waterbury Farrel Foundry & Machine Co., Buffalo, on "British Gear Practice," was received with interest. The development of the gear industry in Great Britain and the status of the technical side of the industry were outlined. It is planned to abstract this address in a forthcoming issue of THE IRON AGE.

Plans of New Companies

The Cornell-Gould Co., Romeo, Mich., incorporated with $50,000 capital stock, will manufacture storage batteries and plates. It has taken over the business of the Romeo Buick Co., and is now operating in a rented building. It plans to build a factory within a short time. C. T. Bradley is secretary.

The F. Heinemann Saw & Mfg. Co., 2219 Seventh Street, S. W., Canton, Ohio, has been organized with $50,000 capital stock to manufacture circular and band saws. It is building a new factory in which it will also make core, pattern and match plates. This is an outgrowth of a business established for eight years. George Heinemann heads the company.

The Elkhart Hardware Mfg. Co., Elkhart, Ind., incorporated with $10,000 capital stock, will manufacture general hardware products, having taken over the Elkhart Mfg. Co. H. M. Stanton is president.

The Connecticut Tool & Engineering Co. has been organized as builder of dies and tools and manufacturer of special machinery. It has leased a plant at 109 Holland Avenue and has started operations. D. J. Williams heads the company.

The Gnome Products Corporation, Hartford, Conn., has been organized with $65,000 capital stock to manufacture electrical and mechanical devices. The company is now active.

The Dayton Auto Replacement Mfg. Co., 233-37 South Jefferson Street, Dayton, Ohio, has been incorporated to manufacture lock washers. Manufacturing will be done by contract. J. L. Stern heads the company.

The Ash Reclaiming Machinery Corporation, 347 Madison Avenue, New York, incorporated with 2500 shares of stock, no par value, has secured the American rights for manufacturing and distributing the Kolumbus coke separator, built in Germany. Machines will be imported for a time but eventually manufacturing will be done in this country.

The Lincoln Typewriter Co., 298 Broadway, New York, has been incorporated with $125,000 capital stock and will buy and rebuild typewriters, either in its own factory or by contract, and will distribute them in other countries. Philip Leonard Green is sales manager.

The Cowles' Shipyard Co., Ohio Street and Buffalo River, Buffalo, has been organized to do boiler and ship repairing. It will have a floating drydock in operation in early fall. B. L. Cowles is president.

The Atlantic Smelting Corporation, Newark, N. J., has been organized with capital stock of $50,000 and will operate a metal smelting and refining plant. All work will be done in the company's plant. M. Buenbaum is president.

The Beattie Machinery Co., Inc., 2082 Fifteenth Street, Detroit, has been organized to manufacture and deal in machinery. It has built and now occupies a new plant. It will deal principally in contractors' equipment. Albert Beattie heads the company.

The Blake Foundry Corporation, Windsor and Blake Streets, Hartford, Conn., has been organized with $50,000 capital stock and will continue the foundry business of Edwin J. Blake, which it has purchased. The company has a well equipped plant and it will specialize in brass, bronze, aluminum and special alloy castings. Wilbur H. Blake is president and treasurer.

The Ornamental Iron & Bronze Co., 338 Brown Street, Philadelphia, has been organized to manufacture ornamental iron specialties, bank screens being the principal line. G. A. Loeben is general manager.

The Linndale Reduction Co., Cleveland, has been organized with $1,000,000 capital stock, Delaware laws, to operate as smelter and refiner. It is connected with the Nichols Copper Co. and Koblitz-Kohn Co. The new company has purchased a plant with furnaces, power machinery, traveling cranes, etc. There will be no awards except for repairs and installation. E. H. Simonson is secretary.

The Valley Rubber Co., Elmgrove, Wheeling, W. Va., has been organized with capital stock of $100,000 to manufacture special rubber making machinery, which is now being built. E. R. Showers is secretary.

Scovill & Ross, Inc., Times Building, Forty-second Street, New York, will manufacture hydraulic jacks through Charles P. Rogers & Co., 198 Pacific Avenue, Jersey City, N. J. O. Ross is treasurer of the new company.

The Hubbard Products Co., 505 North Buckeye Street, Kokomo, Ind., has been organized with $10,000 capital stock to manufacture automobile equipment. It has leased floor space and is preparing for operation. B. J. Hubbard is manager.

The Hercules Combination Lock Corporation, 157 West Lehigh Avenue, Philadelphia, has been organized to manufacture locks for Ford cars. It has a plant and is in full operation. M. Miller is treasurer.

The Interstate Foundry Co., East Sixty-first Street and Roland Avenue, Cleveland, has been organized with $100,000 capital stock and plans to acquire the properties of the Interstate Foundry Co., Cleveland, at the sale which will be held soon. F. W. Bishop is president.

The Modern Appliance Co., 941 West Lovell Street, Kalamazoo, Mich., has been organized as distributer of oil burners and oil-burning equipment. J. H. Lang heads the company.

The Universal Oil Burner Co., 20 Aborn Street, Providence, R. I., has been organized to manufacture oil burners. Manufacturing will be done by contract in Providence. Willard W. Stearns is manager.

The Shakun Industrial & Mfg. Corporation, 154 Nassau Street, New York, has been incorporated with $100,000 capital stock and will manufacture metal stampings. It is now seeking a plant and may locate in New Jersey. F. Shakun heads the company.

The Capitol Machine Co., 15 West Forty-fourth Street, New York, incorporated with $300,000 capital stock to manufacture motion picture machinery, is not ready to announce definitely its plans for the future. W. E. Greene heads the company.

The Dynomotive Radio Corporation, Forty-ninth Street and Eleventh Avenue, New York, incorporated with $50,000 capital stock, to manufacture radio apparatus, now has small quarters at this address, but plans to secure an assembling plant later. Manufacturing will be done by contract. Samuel P. Lavenburg is president.

The Faurot Lock Co., care of Samuel Wechsler, 150 Nassau Street, New York, has been incorporated with $1,000,000 capital stock to manufacture locks and similar products. Definite plans will not be available for about two weeks. L. J. Scherer, H. Saperstein and J. A. Nicolini are the incorporators.

The Ukraine Farming & Machinery Corporation, New York, has been incorporated with $50,000 capital stock, and plans to supervise farming units in various parts of Europe, machinery for which will be supplied from American manufacturers represented by the new company. E. K. Sumerwell, 280 Broadway, New York, who heads the company, states that the principals in the organization will leave for Europe in about two months.

The Acme Grate Co., 80 John Street, New York, incorporated with $20,000 capital stock, has been formed to succeed the Acme Great Bar Works and the Acme Pattern Works. Its line of work will be in the construction and repair of boilers. Joe Goldstein heads the company.

The Robinson Cage Protection Corporation, Brooklyn, has been incorporated with $50,000 capital stock and will manufacture special metal cages for protection to banks. Manufacturing will be done through the Deer Iron Works, Taaffe Place, Brooklyn. S. Robinson is president. Present address is in care of A. S. Galitzka, 1300 Surf Avenue, Brooklyn.

Dulgee Products, Inc., 50 Church Street, New York, incorporated with $25,000 capital stock, will act as distributer of electrical and mechanical tools. B. W. Lilie, L. Skipwith and O. S. Blinn are the principals.

The Albert Vergt Mfg. Co., 14 Dunham Street, Brooklyn, has been incorporated with $50,000 capital stock to manufacture special hardware products. It is now active.

The Hunter Automatic Window Cleaner Co., New York, has been incorporated with $150,000 capital stock to manufacture window cleaning equipment. It plans to do its own work and, though still in the formative stage, is looking for a plant and hopes to be on a business basis soon. George Hunter, 418 Central Park West, heads the company.

The Zarie Almesan Mfg. Co., 1133 Broadway, has been incorporated with $100,000 capital stock to manufacture a new hydraulic shock absorber which will be used on all makes of automobiles. It is now looking for a plant for assembling and manufacturing will be done by contract. Zarie Almesan is president.

Gurney Elevator, Inc., has been organized at Wilmington, Del., to take over several Eastern and Middle Western manufacturers of elevators and negotiations are under way, it is understood, to merge additional companies. Capitalization consists of $1,500,000 in 7 per cent serial notes. Howard F. Gurney will be president of the merged companies; George L. Storm, vice-president, and L. H. Ross, secretary-treasurer.

The Hill-Smith Metal Goods Co., 102 Brookline Avenue, Boston 17, has been organized as the New England branch of the Dayton Automotive Wheel Co. George Q. Hill is president.

Trade Changes

The Erie City Iron Works, maker of boilers, engines and power apparatus, Charles W. McHose, district sales agent, has moved its New York office to 165 Broadway.

The Pittsburgh office of the Sullivan Machinery Co., Chicago, has been moved to Rooms 517-18-19-20, Farmers Bank Building.

The Cave Welding & Mfg. Co., Springfield, Mass., has moved into larger quarters at 453-55 Worthington Street.

The Pennsylvania Pump & Compressor Co., Easton, Pa., has appointed the Pneumatic Equipment Co. as district representative for New England, with offices at 110 High Street, Boston. Products handled by the representative will include the Pennsylvania air compressor of the stationary and portable types, also centrifugal, double suction single stage and multi stage pumps, and a portable pump known as the Penway pumper.

The Kuhlman Electric Co., Bay City, Mich., manufacturer of power distribution and street lighting transformers, has opened a sales office at 300 Madison Avenue, New York, in charge of D. F. Potter, Jr. Mr. Potter is a graduate electrical engineer from Cornell University, class of 1916. After completing the General Electric test course at the Lynn, Pittsfield and Schenectady plants he entered the employ of the Robertson-Cataract Electric Co., Buffalo, as sales manager, becoming sales engineer for the Kuhlman company last year.

Amplex, Inc., New York, has moved to 185 Madison Avenue.

B. Nicoll & Co., coal, coke, pig iron, steel, ores, metals, New York, are now located at 294 Madison Avenue, at Forty-first Street, in the Johns-Manville Building.

The Central Iron & Steel Co., whose New York office for many years has been located at 66 Broadway, has moved to 2 Rector Street. R. H. Maddocks is New York district sales manager.

Colwell & McMullin, New England representatives of the Conveyors Corporation of America, 326 West Madison Street, Chicago, have moved to new offices in the Park Square Building, Boston.

de Courcy Browne, Inc., has moved to 8 West Fortieth Street, New York.

The Inland Engineering Co. has purchased land, buildings and railroad facilities at 505 Kensington Avenue, near 115th Street and Cottage Grove Avenue, Chicago, to which all communications should be addressed.

Henry Prentiss & Co., with headquarters at 149 Broadway, New York and branch offices in Boston, Buffalo, Hartford and Syracuse, has been appointed exclusive agents in the New England States, New York State, northern New Jersey and northeastern Pennsylvania for the Oilgear Co., Milwaukee, manufacturer of variable speed hydraulic power transmissions, hydraulic broaching machines, presses and riveters.

Theodore L. Dodd & Co., 80 East Jackson Boulevard, Chicago, with branch office in the General Motors Building, Detroit, have been appointed western sales representative for the Milwaukee Lock Washer Co., Milwaukee.

H. D. Stalnaker, with offices in the First National Bank Building, Pittsburgh, became manager May 1 of the Eastern district of the Ohio Iron & Metal Co., Chicago, which includes the Cleveland and Pittsburgh offices. Associated with him are Robert J. Cargo and W. O. Preston, who were with him in the Stalnaker Steel Co., and Jay G. Stephens, formerly with Hickman, Williams & Co., Pittsburgh. B. L. Newman, who has been district manager of the Cleveland office, remains in that position under Mr. Stalnaker.

Industrial Finance

The Inland Steel Co. and subsidiaries show net profits for the first quarter of $2,170,489, after interest, Federal taxes, depreciation and depletion, equivalent after preferred dividends to $1.68 per share on 1,182,799 shares of no par value common stock. This compares with first-quarter profits in 1923 of $254,850. Quarterly dividends of 62½c. on common and $1.75 on preferred stock were declared.

Net income of the Ingersoll-Rand Co. for 1923 was $5,971,138, after depreciation, interest, Federal taxes, etc., equivalent to $24.19 per share earned on $24,056,300 of common stock outstanding. This compared with $3,578,262 net income for 1922. There appeared a surplus of $157,604, after all dividends in the 1922 report, as against a deficit after dividends in 1923 of $282,912.

An involuntary petition of bankruptcy has been filed against the Triangle Tool & Die Co., Rochester, N. Y., in Buffalo bankruptcy court.

John W. Horne, who resigned March 1 as secretary of the Western Iron Stores Co., Milwaukee, has filed a voluntary petition in bankruptcy, giving liabilities as $134,656, and assets as $5,631. Unsecured liabilities include an item of $62,000 consisting of accommodation paper signed by the bankrupt and several others in behalf of the Western Iron Stores Co.

The Fidelity Title & Trust Co. and William H. Lewis of Pittsburgh were appointed receivers of the Clark Car Co. of Pennsylvania, April 10, by Judge W. H. S. Thomson in the United States District Court at Pittsburgh, in an equity suit brought against the company by the Clark Car Co. of New Jersey. Litigation has been pending in the court for almost a year to determine the legality of the license under which the Pennsylvania concern is carrying on the business of manufacturing and selling railway dump cars, invented by Charles H. Clark.

H. E. Schweitzer, secretary and general manager of the Imperial Drop Forge Co., Indianapolis, states that there is no foundation to the rumor that operations of the company had ceased pending reorganization. Mr. Schweitzer took over the management of the business last October and now has the plant going at normal capacity. L. G. Bayrer was recently employed as works manager with a view to increasing production.

Industrial News Notes

Operations at the Baldwin Locomotive Works have been increased to slightly better than 30 per cent of capacity. This is the highest for the year. Orders on the books stand at about $9,100,000 against $8,500,000 a month ago. During the last two weeks new business has been keeping pace with orders filled. The number now employed is 6000 against 5000 earlier in the year. Of the outlook for the rest of the year, President Samuel Vauclain said: "I have every confidence in a steadily improving business in the months ahead. Business may be bad in spots, but you can't load a million freight cars every week unless a good many people are busy."

The National Carbon Co., Inc., has moved its Chicago brush finishing plant from 560 West Congress Street to larger quarters at 551 West Monroe Street. This new location will enable the branch to double its output.

The Bristol Co., Waterbury, Conn., manufacturer of recording instruments and distributer of radio equipment, has leased 2740 sq. ft. in the Larkin Building, 3617 South Ashland Avenue, Chicago, to take care of the middle western business. Most of this area will be devoted to repairing and recalibrating instruments. The present salesroom and offices of the Bristol Co. will be maintained in the Monadnock Building.

J. D. Wallace & Co., manufacturer of portable machines, has completed construction on a new one-story, fireproof factory at 134-58 South California Avenue, Chicago. Half of the plant is ready for occupancy and the remainder will be ready soon.

The Blumenthal-Kahn Electric Co., 505 North Eutaw Street, Baltimore, manufacturer and dealer in electric fixtures, appliances, etc., has leased property at 518 North Charles Street and will build a two-story addition to be used as a factory.

Donner Steel Co. Earnings

Earnings of Donner Steel Co. for the quarter ending March 31, 1924, are reported as follows:

Net earnings from operations, after repairs, maintenance, taxes, etc.	$593,635
Less interest on bonds and notes	182,091
Net earnings	$411,544
Depreciation	104,000
Net income	$307,544
Surplus Dec. 31, 1923	633,412
Surplus March 31, 1924	$940,956

Machinery Markets and News of the Works

MARKET INACTIVE

Amount of Pending Inquiry Large—Resumption of Buying Looked For

Chicago Maker of Butchers' and Grocers' Equipment Inquires for Eight Tools

Dullness was the downward feature of the week in practically all machine-tool buying centers. Inquiries are being received, however, and the amount of pending business is large. In Cincinnati, opinion is expressed that a resumption of buying in the near future is to be expected. Little activity is noted from the automotive industry, but full operations in some of the factories which have curtailed output is looked for shortly, in which case it is likely that some orders on which suspensions had been asked will be reinstated. There has been fair business in used tools. In Cleveland the demand for automatic screw machines in single orders is reported to be holding up well.

A Chicago maker of equipment for butchers and grocers is in the market for eight machine tools.

The Santa Fe and other railroad lists are still pending, but there is no indication as to when orders will be placed against them. The Boston & Maine has added a shaper to its recent inquiry, bringing the total of pending tools up to seven.

The inquiry from the Youngstown Sheet & Tube Co. is still regarded as active and it is expected that the Marks will require machine-tool equipment in connection with their new butt-weld mills now being constructed at the former Symington ordnance plant.

Action on the Gary Tube Co. list has been indefinitely postponed. The Inland Steel Co. has placed formal orders for a 36 x 36 in. x 10 ft. planer, a 62-in. boring mill and a large lathe.

The Nash and Studebaker companies continue to buy a few tools from time to time, the latter company having recently closed for five milling machines.

New York

NEW YORK, May 6.

WITH few exceptions, purchases of machine-tools are confined to single orders. The Boston & Maine has added an inquiry for a shaper to its list of tools previously asked for, bringing the total pending to seven. Evidently inquiry on this list is being divided, separate requests for prices being sent to makers of particular tools. The New York Central has closed on three small tools including a 4-ft. radial drill and a grinder and has asked for a lathe. The United Fruit Co., has purchased a 6-ft. radial drill and the Farrell Foundry & Machine Co., Ansonia, Conn., a 5-ft. radial drill. The Magnus Co., from Chicago has bought a car box boring machine. The International Railway Co., Buffalo, N. Y. has closed on a 200-ton carwheel press. The Southern Railway has closed on at least part of its list of tools, including five punches and shears. As the bids on the Norfolk & Western list closed April 30, it is expected that action will be taken toward the end of the month.

The N. C. Failor Co., 30 Church Street, New York, is inquiring for a 42-in. carwheel lathe, center or end drive; 90- or 100-in. driving wheel lathe; direct connected, steam driven electric generators and steam driven air compressors, 500 to 1000 cu. ft. air, 125 lb.

The Crane Co., 836 South Michigan Avenue, Chicago, has authorized plans for a four-story factory branch, 100 x 100 ft., on the Flatbush Avenue Extension extending to 35-43 Debevoise Place, Brooklyn, a site recently acquired. Bids will be asked in July. Local offices of the company are at 247 Willoughby Avenue.

The P. D. Garage Corporation, 528 West 125th Street, New York, has purchased a two-story building to be erected on Sixty-eighth Street, near First Avenue, for $110,000, and will establish a new service, repair and garage at this location. It has also leased a building on Crotona Parkway, near Tremont Avenue, for similar works.

The New York Edison Co., 130 East Fifteenth Street, New York, will install a 10-ton traveling crane and make improvements and extensions in its one-story gas retort plant at 616 West Forty-second Street, to cost about $55,000.

The Indian Stores Department, Calcutta, India, will be in the market shortly for machinery in connection with the Lloyd Barrage in Sind, comprising excavating machines, quarrying machinery, industrial railroad apparatus, machine and bench tools for the repair and construction shops.

The New York Central Railroad Co., Grand Central Terminal, New York, has acquired property at Elmsford, N. Y., as a site for a new steam-operated electric power plant to be used in connection with the proposed electrification of its Putnam division.

Ovens, power equipment, conveying and other machinery will be installed in the two-story and basement plant to be erected at Washington Street and Lefferts Avenue, Brooklyn, by the General Baking Co., 342 Madison Avenue, New York, estimated to cost $300,000. C. B. Comstock, 110 West Fortieth Street, is architect and engineer. The Turner Construction Co., 244 Madison Avenue, is the general contractor.

The G. Danzis Co., 47 Ann Street, New York, manufacturer of tools, is said to be planning for the purchase of a surface grinder, with magnetic chuck, etc.

The Otis Elevator Co., Eleventh Avenue and Twenty-sixth Street, New York, has preliminary plans for an addition to its works at Yonkers, N. Y., to cost $125,000, and expects to take bids late in the summer or early fall. Edward A. Fitch is local manager. The company has recently arranged for an increase in capital from $15,000,000 to $25,000,000, a portion of the proceeds to be used for expansion. W. D. Baldwin is chairman of the board.

The Rapid Transit Commission, 49 Lafayette Street, New York, George McAneny, chairman, is asking bids for superstructure work for the first unit of its proposed electrical and mechanical repair shop at the Coney Island Yards of the Municipal Rapid Transit System, to cost about $500,000, and will award contract at an early date. A one-story maintenance and storage building will also be erected by the Commission on Westchester Avenue, Bronx.

The American Sugar Refining Co., 117 Wall Street, New York, is planning for the erection of a new refinery on the waterfront, including power house and other buildings reported to cost $500,000 with machinery. The company is said to be arranging for abandoning its present refinery on South Second Street, Brooklyn, removing the works to the new location. Other units will be built later.

Cohn Brothers, 361 Stone Avenue, Brooklyn, architects, have completed plans for a four-story automobile service and repair building at 856-70 Franklin Avenue, 100 x 150 ft., to cost $190,000 with equipment, for which work will begin at once.

Ovens, power equipment, conveying and other machinery will be installed in the four-story plant, 75 x 105 ft., to be erected at 506-8 East Seventy-sixth Street, by the Fink Bread Co., 438 East Seventy-second Street, New York, for which bids will be asked on general contract this month. It is estimated to cost $100,000. D. S. Beardsley, 116 West Thirty-ninth Street, is architect.

The Parker Oil Corporation, Hulst Street, Long Island

City, has plans for a one-story automobile service and repair building for company motor trucks and cars, 60 x 100 ft., to be located on Hulst Street, for which work will soon begin. Baker & Ludwig, 9 Jackson Avenue, are architects.

The City Commission, Orange, N. J., will begin the construction of a new unit at the municipal electric power plant to cost $33,800. It is expected to double the capacity of the station. Fred Luthy is chief engineer.

The Board of Education, 22 Valley Road, Montclair, N. J., will take bids until May 27 for manual training shop equipment for the local schools, as specified in List I, on file. The board is considering the installation of a manual training department at the proposed George Innes high school, estimated to cost $500,000, for which Starrett & Van Vleck, 8 West Fortieth Street, New York, are architects.

The Day-Elder Motors Corporation, 20 Coit Street, Irvington, N. J., manufacturer of motor trucks, has plans for the erection of a new one-story assembling plant at Paine Avenue and Coit Street, 100 x 308 ft., to cost approximately $95,000. The company recently disposed of its present works to the Public Service Corporation, Newark, which will use the plant for motor bus repair and construction. The Day-Elder company will remove equipment to the new building when completed and install additional machinery. Fred G. Elder is vice-president.

The Crane Co., 84 Mechanic Street, Newark, N. J., with headquarters at 836 South Michigan Avenue, Chicago, has purchased property at 432-36 Mulberry Street, 81 x 135 ft., heretofore held by the Manufacturers' Can Co., Harrison, N. J., as a site for a new three-story factory branch totaling 40,000 sq. ft. floor space, to cost $150,000. It is expected to have the structure ready for occupancy by the end of the year.

The Ballston Insulating & Composition Co., Ballston Spa., N. Y., recently organized to manufacture insulation and radio products, is in the market for hydraulic presses, a pressure tank, an accumulator and toggle presses. B. Cohen is secretary.

Philadelphia

PHILADELPHIA, May 5.

PROPERTY at 235 North Twelfth Street, Philadelphia, with two-story building, 19 x 103 ft., has been acquired by the Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York, for a local works. The company is now located at 1740 Market Street.

George Wilcox, Land Title Building, Philadelphia, has plans for a two-story automobile service, repair and garage building on Sixty-ninth Street, Upper Darby, Pa., estimated to cost $200,000 with equipment.

Work will soon begin on the second unit of the new plant of the General Electric Co., Schenectady, N. Y., at Sixty-eighth Street and Elmwood Avenue, West Philadelphia. The first unit of the plant is nearing completion and is expected to be ready for service about the middle of July. Plans are in progress for the construction of two additional units, for which bids will be asked in the near future, making a total plant investment of about $7,500,000, with facilities for the employment of about 5000. The works will be devoted primarily to the manufacture of electric switchboards and accessory apparatus, replacing to a large extent the present departments of this character at the Schenectady and Baltimore plants, from which considerable equipment will be transferred.

The Hoopes & Townsend Co. has been charatered under Delaware laws with capital of $2,700,000 to take over and expand a portion of the business of the present company of the same name at Broad and Buttonwood Streets, Philadelphia, for the manufacture of bolts, nuts, rivets, etc. A subsidiary, recently organized, the Hoopes & Townsend Steel Co., has also been chartered under Delaware laws with capital of $4,000,000, and will take over that portion of the business devoted to the production of steel as well as metal-working machinery. Clement R. Hoopes and Barton Hoopes, Jr., head the new organizations.

The Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, has approved final plans for the construction of a new steam-operated electric generating plant at Port Richmond, to consist of three units, each with capacity of 200,000 kw., estimated to cost close to $10,000,000. Foundations for the first unit will proceed at once with intention of having this section of the plant ready for service in the fall of 1925.

Frank C. Holberg, Jr., 1011 Chestnut Street, Philadelphia, manufacturer of safety devices, has awarded a general contract to William F. Koelle & Co., 2601 Oxford Street, for a new one-story plant at Thirteenth and Hamilton Streets.

The Locust Garage Co., Philadelphia, has awarded a general contract to the Rose Construction Co., North American Building, for a two-story service and repair building, 65 x 200 ft., estimated to cost $90,000 with equipment. Neubauer & Supowitz, 926 Chestnut Street, are architects.

Riter Brothers & Co., 1022 Race Street, Philadelphia, manufacturers of metal products, have had plans drawn for a new building at Stokeley Street and Westmoreland Avenue. Clarence E. Wunder, 1415 Locust Street, is architect. It will be one and two stories, 65 x 300 ft.

Officials of the Victor Talking Machine Co., Camden, N. J., have organized the Victor Talking Machine Co. of Canada, with capital of $1,000,000, to take over the plant and property of the Berlinger Gramophone Co., Ltd., Montreal. Plans are projected for the erection of an addition to the present works for the manufacture of cabinets, as well as talking machine parts, assembling, etc. Eldridge R. Johnson, head of the parent company, will act in like capacity with the Canadian company.

John Rich & Brothers, Woolrich, Pa., will build a one-story machine shop at their local woolen mills, 30 x 40 ft., with equipment for parts manufacture and repair work of tetxile machinery.

The Philadelphia & Reading Railroad Co., Reading Terminal, Philadelphia, will take bids until May 10 for the construction of a new automatic coaling station at Birdsboro, Pa., as per plans and specifications on file at the office of Samuel T. Wagner, company architect. It has awarded a general contract to the Curtis-Grindrod Co., 10 South Eighteenth Street, Philadelphia, for a new machine shop at St. Claire, Pa., for which work will begin at once.

Manual training equipment will be installed in the three-story junior high school to be erected at Lancaster, Pa., estimated to cost $250,000, for which bids will soon be asked on a general contract. C. Emlen Urban, Woolworth Building, is architect.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, has awarded a general contract to the Columbia Construction Co., Altoona, Pa., for a one-story power house at its new Juniata shops, estimated to cost $50,000.

The plant and property of the Birdsboro Electric Co., Birdsboro, Pa., have been acquired by new interests. Plans are under way for extensions and the installation of additional generating and other machinery. G. Cleveland Wolf will continue as general manager.

Fire, April 29, destroyed a portion of the oil storage and distributing plant of the Tuscarora Oil Co., Center Bridge, Pa., with loss estimated at $200,000. It is planned to rebuild.

The Bryden Horseshoe Co., Catasauqua, Pa., is making ready to raze its No. 2 mill and will replace the structure with a new building. The present No. 3 mill will likewise be razed and a new building erected.

The Bressler Sheet Metal Works, Lebanon, Pa., incorporated with capital stock of $70,000, has taken over the business operated 21 years by C. O. Bressler. Considerable new machinery has been bought and the company now is interested in plate-forming and angle-bending rolls, and a Gray cutter. Ground has been purchased for the construction of a plant on which work will be started shortly. C. O. Bressler is president and treasurer, and W. R. Benzing, secretary.

The Galvanized Products Co., East Stroudsburg, Pa., is in the market for a No. 60 Waterbury thread roller, either new or used.

Pittsburgh

PITTSBURGH, PA., May 5.

IT has been a dull week in the local machinery market. Purchases of individual tools have been few and action against the several good-sized lists, before the trade for several weeks, still is deferred. Railroad buying is notably slack. New inquiries are decidedly fewer than during the first quarter of the year. The crane market is also quiet.

New interests are said to be negotiating for the purchase of the plant and property of the Turner-Frick Gas Engine Co., Sharon, Pa. It is proposed to enlarge and improve the works with the installation of additional equipment. T. A. Oakley, formerly president of the Keystone Engineering Co., whose plant was destroyed by fire a number of months ago, is understood to be at the head of the purchasing syndicate.

The Railway & Industrial Engineering Co., Greensburg, Pa., has preliminary plans under way for a two-story addition, 70 x 224 ft., estimated to cost $100,000 with equipment. A traveling crane will be installed.

The McKain-Davies Fishing Tool Co., Parkersburg, W. Va., recently formed with a capital of $25,000, will succeed to the business of the J. B. McKain Fishing Tool Co., manufacturer of well drilling machinery, etc. Plans are under way for a one-story machine shop and mechanical

The Crane Market

Few new inquiries for cranes have appeared in the past week and with the exception of a few awards, the market has been extremely quiet. May 3, the Bureau of Yards and Docks, Washington, opened bids on a 20-ton, 3-motor, overhead crane for the Charleston Navy Yard. Pending business includes bucket handling cranes asked for by Stone & Webster for the Indiana Electric & Mfg. Co. and by Dwight P. Robinson & Co., New York for the Mississippi Glass Co. The Mill Power Supply Co., Birmingham, Ala., has closed on a 100-ton, 41-ft. span overhead traveling crane. The recent inquiry of the American Constructon & Security Co., 50 Broad Street, New York, for three small hand power cranes is stated to have been for estimating purposes only.

In the Pittsburgh district the Westinghouse Electric & Mfg. Co. is expected to place some of the cranes this week for the enlarged transformer plant at Sharon, Pa. It is also expected that the American Sheet & Tin Plate Co. will close this week on a 15-ton electric crane with 5-ton auxiliary for its roll and machine works at Canton, Ohio. Clark Brothers Hardware Co., Jamestown, N. Y., is asking prices on a 5-ton, 33-ft. span crane.

Among recent purchases are:

Austin Co., Philadelphia, ten 3-ton, 28-ft. span, 1-motor, single I beam cranes and a 5-ton, 67-ft. 6-in. span, 3-motor overhead traveling crane for the Boynton Furnace Co., Newark, N. J., from the Shepard Electric Crane & Hoist Co.

Public Service Production Co., Newark, N. J., a 50-ton overhead traveling crane, from the Shaw Electric Crane Co.

General Electric Co., Schenectady, N. Y., a 50-ton overhead traveling crane, for installation at Schenectady, from the Morgan Engineering Co.

United States Cast Iron Pipe & Foundry Co., Burlington, N. J., a 10-ton trolley for installation at Birmingham, Ala., from the Pawling & Harnischfeger Co.

Truscon Steel Co., Youngstown, Ohio, a 10-ton, 18-ft. span, hand power crane, for export, from the Reading Chain & Block Corporation, through Arthur Appleton, 29 Broadway, N. Y.

William P. McDonald Construction Co., Brooklyn, N. Y., a crawl-tread crane to handle ¾-cu. yd. bucket for use at Limestone, Fla., from the Pawling & Harnischfeger Co.

Standard Sanitary & Mfg. Co., Baltimore, Md., a 27½-ton locomotive crane with 45-in. Ohio magnet, from the Industrial Works.

Commonwealth Steel Co., Granite City, Ill., a 22½-ton, 45-ft. boom locomotive crane, from the Industrial Works.

works. The new company is headed by John B. McKain and Thomas H. Davies.

The Common Council, Grafton, W. Va., is considering the installation of electric-operated pumping equipment in connection with proposed extensions and improvements in the municipal waterworks estimated to cost $125,000.

The Parkersburg Machinery Co., Parkersburg, W. Va., has plans for a one-story machine shop for the manufacture of oil-well drilling equipment and other oil field tools estimated to cost $24,000.

The Lockhart Iron & Steel Co., River Road, McKees Rocks, Pa., has tentative plans under way for rebuilding its plant, recently destroyed by fire, with loss of $350,000 including equipment. C. J. Gillespie is superintendent.

The Motor Car & Truck Co., Huntington, W. Va., will soon ask bids for a three-story service and repair building, 105 x 200 ft., estimated to cost $130,000 with equipment. Meanor & Handloser, Professional Building, are architects.

The Philadelphia & Reading Railroad Co., Reading Terminal, Philadelphia, is having preliminary plans drawn for the proposed electrification of its line between Frankville and St. Clair, Pa., including power plant and automatic electric substations, estimated to cost $1,500,000.

Manual training equipment will be installed in the two-story and basement high school to be erected at Windber, Pa., estimated to cost $175,000, for which foundations will be laid at once. Henry Reinhold, Jr., 1513 Walnut Street, Philadelphia, is architect.

St. Louis

ST. LOUIS, May 5.

THE Board of Water and Light Commissioners, Higginsville, Mo., has tentative plans for the installation of additional equipment in the municipal electric power plant, including generator and accessory apparatus. O. L. Hebbler is superintendent.

Manual training equipment will be installed in the proposed high school to be erected at Hominy, Okla., estimated to cost $85,000, for which bids have been asked on a general contract. John O. Bradley & Co., Cushing, Okla., are architects.

The Western Iron & Foundry Co., 702 East Second Street, Wichita, Kan., will defer for about 60 days a call for bids for the erection of its one-story foundry, 60 x 140 ft., estimated to cost $55,000. J. F. Warren is president.

The American Can Co., 120 Broadway, New York, is reported to have authorized immediate contract awards for the erection of the proposed addition to its plant at Kansas City, Mo., estimated to cost approximately $500,000 with machinery.

The Common Council, Potosi, Mo., plans the installation of electric-operated pumping machinery in connection with a proposed waterworks and sewage system, estimated to cost $50,000. The Alexander Engineering Co., Woodruff Building, Springfield, Mo., is engineer.

Manual training equipment will be installed in the two-story and basement high school to be erected at Great Bend, Kan., estimated to cost $250,000, for which bids will soon be asked on a general contract. T. W. Williamson & Co., Central National Bank Building, Topeka, Kan., are architects.

The Union Electric Light & Power Co., Locust and Twelfth Streets, St. Louis, is perfecting plans for a new automatic power sub-station, 42 x 145 ft., estimated to cost $165,000 with equipment.

Ovens, power equipment, conveying and other machinery will be installed in the three-story plant, 100 x 140 ft., to be erected by the Fort Smith Biscuit Co., Fort Smith, Ark., estimated to cost $75,000 exclusive of machinery. C. H. Wortz is president.

The Common Council, Frederick, Okla., has tentative plans for the construction of a municipal electric light and power house, using oil-operated engines, estimated to cost $75,000 with equipment.

Manual training equipment will be installed in the two-story and basement high school to be erected at Manhattan, Kan., estimated to cost $130,000, for which bids will be asked on a general contract about May 15. T. W. Williamson & Co., Central National Bank Building, Topeka, Kan., are architects.

The Blackwell High Line Co., Blackwell, Okla., has tentative plans for the construction of a new hydroelectric power house at Deer Creek, Okla., estimated to cost $75,000. R. W. Porter, Blackwell, is engineer.

Buffalo

BUFFALO, May 5.

MACHINE tool business is desultory. Dealers report having closed some orders which have been hanging fire and are inclined to see better bookings in May than in April. Heavy sales are not looked for this month, but the opportunities for small transactions appear favorable. A few used tools were moving throughout the week and some single orders were taken.

The Macbeth Body Co., 218 Hurst Building, Buffalo, recently incorporated with capital stock of $400,000, has purchased a site on Erie Avenue, North Tonawanda, and will erect a plant for the manufacture of commercial automobile bodies. Frank W. Buse, is president and E. J. Spang, vice-president.

The Carthage Machine Co. of Canada, Ltd., is a subsidiary of the Carthage Machine Co., Carthage, N. Y., and will establish a plant in Belleville, Ont., for the manufacture of pulp and paper mill machinery. A. K. Hinds, Carthage, N. Y., is general manager.

A one-story power plant, 46 x 73 ft., will be part of the equipment of the Derbrah Silk Corporation, William J. Hartman, president, which proposes to erect a factory on Skillen Street, Buffalo. The main building will be three stories and will have 16,750 sq. ft. of floor space.

The American Hollow Boring Co., Erie, Pa., manufacturer of hollow bored forgings and steel shafts, is erecting an addition to its plant.

The Northern Equipment Co., 711 West Eleventh Street, Erie, Pa., manufacturer of pipe, steam fittings, etc., has awarded a general contract to Kirschner Brothers, 421 East Ninth Street, for a one-story and part basement addition, 80 x 130 ft., to cost $35,000. A. F. Schotte, Marine Bank Building, is architect and engineer.

The City Council, Cortland, N. Y., is considering the installation of electric-operated pumping equipment in con-

nection with improvements in the municipal waterworks estimated to cost $55,000.

Manual training equipment will be installed in the three-story junior high school to be erected at Binghamton, N. Y., estimated to cost $500,000, for which bids are being received on a general contract until May 14. T. A. Lacey & Sons, Kilmer Building, are architects.

The New York State Gas & Electric Corporation, South Cayuga Street, Ithaca, N. Y., is planning for the construction of an automatic power substation at Colliers, N. Y., estimated to cost $450,000.

The Commercial Packers' Association, Wolcott, N. Y., F. Hill, chairman, North Rose, N. Y., contemplates the installation of a refrigerating plant in its proposed five-story packing house, 100 x 123 ft., estimated to cost $160,000, including equipment.

Manual training equipment will be installed in the two-story high school to be erected at Dolgeville, N. Y., estimated to cost $225,000, for which foundations will soon be laid. Tooker & Marsh, 101 Park Avenue, New York, are architects.

W. D. Gilson, Riverside Drive, Canton, N. Y., will purchase a bench planer, vertical drill and other equipment.

The M. Fierstein Co., 258 William Street, Buffalo, plans for the installation of ornamental iron-working equipment in a local building.

Lloyd P. Adams, Moose Building, Waterloo, N. Y., architect, has plans for the erection of a three-story automobile service and repair building, 40 x 57 ft., estimated to cost $65,000 including equipment, for which the owner's name is temporarily withheld.

The Board of Public Welfare, Jamestown, N. Y., is considering the installation of electric-operated pumping machinery at its proposed sewage disposal works, estimated to cost $170,000, for which it will soon ask bids.

New England

BOSTON, May 6.

MACHINE tool business is only slightly better than it was in the closing days of April. Buying is virtually confined to the purchase of single tools, mostly used, recent sales including a new 36-in. American lathe by a Peabody shop; two punches by the Boston & Albany Railroad, which is in the market for a used universal hollow hexagon turret lathe; a radial drill and a milling machine, both used tools, by a Franklin, Mass., manufacturer; used 16-in. shapers by the State of Massachusetts; a used 2A Warner & Swasey by an Andover concern, and miscellaneous equipment. New inquiries are decreasing rather than increasing and some old inquiries, heretofore believed to be live ones, have been put into the discard. Prices are fairly well maintained on new tools notwithstanding the quietness of the market. Business in small tools and machine parts has fallen off.

Plans are in progress for a three-story and basement, 40 x 168 ft., and two-story, 80 x 110 ft., addition to a West Roxbury, Boston, school to cost $400,000, which will contain metal and woodworking shops. Thomas P. Glynn, City Hall Annex, is chairman of the school house commission.

The Westinghouse Electric & Mfg. Co., Pittsburgh, is to transfer the manufacture of fans and fan motors from its Newark plant to the East Springfield, Mass., works. The company also will erect a new heating plant at East Springfield.

The Ashland Associates is being organized to purchase property available for the enlargement of the plant of the Warren Clock Co., Ashland, Mass.

Boston contemplates the erection within the near future of a one-story addition to its Charlestown high school manual training shop, and eventually a three-story addition. The architect has not been selected.

H. F. Staples, 35 Ship Avenue, Medford, Mass., will erect a one-story, 45 x 60 ft., machine shop.

Charles H. Tenney & Co., 200 Devonshire Street, Boston, engineers, have awarded contract for a coal handling plant at Salem, Mass., for which conveying machinery is required. The owner's name is withheld.

The town of Arlington, Mass., has appropriated $139,500 for a fire alarm station at Massachusetts Avenue and Broadway. A small amount of metal-working equipment will be required.

Fire, April 25, destroyed a portion of the plant of the North Wayne Tool Co., North Wayne, Me., with loss estimated at $25,000. It is planned to rebuild.

The Plume & Atwood Mfg. Co., 470 Bank Street, Waterbury, Conn., manufacturer of brass goods, has asked bids on a general contract for a five-story addition, 50 x 150 ft., to cost $100,000 with equipment.

The Colling Tool & Machine Co., Hartford, Conn., has plans for a one-story shop, 50 x 100 ft., for which bids will soon be asked on a general contract. Greenwood & Noerr, 847 Main Street, are engineers.

The Worcester Lawn Mower Co., Fremont Street, Worcester, Mass., has filed plans for two additions, each one-story, to cost $30,000.

Bids will be asked about the middle of May by the G. McLachlan Hat Mfg. Co., Danbury, Conn., for a one-story power house, estimated to cost $55,000. The Fletcher-Thompson Co., 542 Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

The Oquossoc Light & Power Co., Rangeley, Me., contemplates the installation of additional equipment at the generating plant, comprising water turbine, generator and auxiliary machinery. H. B. Amber is treasurer.

The City Light Department, Braintree, Mass., is planning for the installation of additional equipment at the municipal electric power plant, including turbo-generator, 2500 kva. capacity, boilers and auxiliary equipment. F. B. Lawrence is manager.

The E. A. Eddy Machinery Co., Providence, R. I., is in the market for an E. G. 54 Ferracute toggle embossing press, an 800-ton coining press and an 800-ton toggle embossing press.

Chicago

CHICAGO, May 5.

SALES totals of Chicago merchants for April averaged somewhat lower than for March. However, business continues to develop in fair volume and the amount of pending inquiry is large. Action on the Gary Tube Co. list has been indefinitely postponed, but the Inland Steel Co. has placed formal orders for a 36 x 36-in. x 10-ft. planer, a 62-in. boring mill and a large lathe. The inquiry from the Youngstown Sheet & Tube Co. is still regarded as active and it is expected that the Marks will require machine tool equipment in connection with their new butt-weld mills, now being constructed in the former Symington ordnance plant.

The Santa Fe and other railroad lists are still pending and there is no indication as to when orders will be placed against them. The Illinois Car & Mfg. Co., Hammond, Ind., has ordered a 54-in. 400-ton hydraulic Chambersburg wheel press. The Nash and Studebaker companies continue to buy a few tools from time to time to improve their manufacturing methods. The latter company recently closed for five milling machines. A local maker of equipment for butchers and grocers is in the market for an assortment of eight machine tools.

Leichenko & Esser, 38 South Dearborn Street, Chicago, have completed plans for a one-story mill construction factory, 140 x 360 ft., with concrete block exterior, 160-ft. smoke stack and gas producing plant at Monon, Ind., for the Granolite Art Products Co., Milwaukee, Wis., to cost $150,000.

Roberts & Oake, Inc., packer, Forty-fifth Street and Racine Avenue, Union Stock Yards, Chicago, has awarded a general contract for a five-story reinforced concrete packing plant, 66 x 104 ft., 89 x 150 ft., and 11 x 81 ft., to cost $250,000.

The Illinois Tool Works, 154 West Erie Street, Chicago, has awarded a general contract for a one-story plant, 240 x 240 ft., at 2501-09 North Keeler Avenue, to cost $125,000.

The Graff Motor Coach Co., 3201 South Michigan Avenue, Chicago, has awarded a general contract for a three-story motor coach assembly plant, 74 x 143 ft., at 3669-73 South Michigan Avenue, to cost $100,000.

The Aetna Porcelain Enameling Co., 4701 Augusta Street, Chicago, has awarded contracts for a one-story brick factory at that address to cost $6,000.

The Eagle Iron Works, Des Moines, Iowa, is completing a new plant, including a foundry, office building, pattern shop and storage, and machine and structural shop, at a cost of $250,000.

The Elgin, Joliet & Eastern Railroad will soon award contract for a power house at East Joliet, Ill.

The Mendota Mfg. & Transfer Co., Mendota, Ill., will

erect a two-story addition, 40 x 40 ft., to house increased machine shop facilities.

The Biflex Products Co., Waukegan, Ill., and the L. P. Halladay Co., Streator, Ill., both manufacturers of automobile bumpers, have merged. The Halladay company contemplates plant expansion.

D. A. Raymond of the Federal-Huber Co., manufacturer of plumbing supplies, 234 North Halsted Street, Chicago, and the Plano Foundry Co. have purchased the Moline Plow Co. properties at Plano, Ill.

Contract has been awarded to the Holm-Page Co., Rockford, Ill., for a foundry and factory building for the Rockford Brass Works, estimated to cost $70,000.

The Sanitary Scales Co., Belvidere, Ill., is in the market for equipment for a plant under construction on East Lincoln Avenue.

The City Council, Hammond, Ill., contemplate extensions and improvements to the municipal waterworks, estimated to cost $150,000 for which some electrical pumping equipment will be required.

Bids will be received by the Common Council, Luverne, Minn., until June 3 for equipment for a new unit at the municipal electric power plant, including engine, generator of 350 kw. capacity, and accessory apparatus. C. W. Campbell is city recorder.

The Farm Specialty Mfg. Co., St. James, Minn., manufacturer of farming equipment, agricultural implements, etc., is considering plans for a one-story factory, estimated to cost $28,000. C. H. Halverson is president.

Swift & Co., Union Stock Yards, Chicago, contemplate the installation of a refrigerating plant at their proposed three and four-story and basement packing works, 95 x 145 ft., at Beatrice, Neb., estimated to cost $110,000 with equipment.

The Enterprise Boiler & Tank Works, Inc., 2308 Wabansia Avenue, Chicago, will soon ask bids for a new one-story plant on North Long Street, 50 x 145 ft. Harold E. Gallup, 646 North Michigan Avenue, is architect and engineer. B. A. Stege is one of the heads of the company in charge.

The State Board of Administration, Bismarck, N. D., is planning the installation of additional power equipment at the electric plant at the State University at Grand Forks, N. D., including generator, engine and accessory apparatus.

The Nebraska Power Co., Farnam and Fifteenth Streets, Omaha, Neb., will begin the erection of a one-story equipment storage and distributing plant, with machine and repair department, 115 x 260 ft., estimated to cost $165,000, with equipment. F. S. Stott, Kennedy Building, is architect.

The Barrows Lock Co., Lockport, Ill., is preparing plans for a one-story addition, 64 x 100 ft., estimated to cost $24,000, to be equipped as a brass foundry. Charles W. Webster, Cutting Building, Joliet, Ill., is architect.

Detroit

DETROIT, May 5.

PRELIMINARY plans have been authorized by the Standard Computing Scale Co., 1116 Library Street, Detroit, for a five-story addition to cost more than $100,000 with equipment. Smith, Jinchman & Grylls, Washington Arcade, are achitects and engineers.

The Carey Co., 6197 Hamilton Avenue, Detroit, is said to be arranging for the early purchase of equipment for a sheet metal works to be installed in existing building.

The Capitol Brass Co., 2306 Franklin Avenue, Detroit, will begin work soon on a one-story plant on West Jefferson Avenue, 85 x 400 ft., to cost $140,000. Lane, Davenport & Peterson, Charlevoix Building, are architects.

The Michigan Artificial Ice Products Co., Detroit, is perfecting plans for an ice-manufacturing and cold storage plant at Albion, Mich., to cost about $80,000.

The F. L. & J. C. Codman Co., 745 Beaubien Street, Detroit, manufacturer of abrasives, grinding wheels, etc., will begin the erection of a one-story plant, 75 x 100 ft., estimated to cost $20,000 exclusive of machinery.

The Calumet & Hecla Co., Calumet, Mich., operating copper properties, is arranging for the installation of equipment for burning pulverized fuel at its different furnaces in this district.

Manual training equipment will be installed in the two-story and basement high school to be erected at Owosso, Mich., estimated to cost $350,000, for which bids will soon be asked on a general contract. Lane, Davenport & Peterson, Charlevoix Building, Detroit, are architects.

The Grand Trunk Western Lines, Battle Creek, Mich., will ask bids in May for the erection of a new engine house and locomotive repair shops on Hall Street, estimated to cost $80,000. D. T. Crawford is superintendent, and T. T. Irving, 400 East Jefferson Avenue, Detroit, is engineer.

The Holleman & Deweerd Automobile Co., Holland, Mich., will have plans drawn for a one-story automobile service and repair building on property recently acquired, 110 x 190 ft., estimated to cost $80,000, with equipment.

The Auto Body Co., Lansing, Mich., is planning for extensions for the manufacture of enclosed bus bodies, as well as regular closed car bodies.

The Dowagiac Mfg. Co., Dowagiac, Mich., recently organized, will take over and expand the plant and business of the Furnace Fan Corporation. It is expected to develop a considerable increased capacity in the line of grain drilling equipment. The company was at one time known as the Dowagiac Drill Works. John P. Wagner heads the new organization.

Charles T. Reider, Petoskey, Mich., and associates, are organizing a company to build and operate a foundry for the production of brass, bronze and other metal castings.

The Central Gasket & Stamping Co., Mount Morris, Mich., organized with capital stock of $500,000, will manufacture gaskets, dies, etc., and expects to start work soon on a new plant, 100 x 150 ft. The company will be in the market for building materials and all kinds of stamping machines. E. J. Roberson is president.

Cincinnati

CINCINNATI, May 5.

ORDERS were scarce last week in the machine tool industry, and while buying has not ceased entirely, bookings were considerably less than for either of the two weeks preceding. Inquiries, however, still continue to come out in goodly numbers and it is the general opinion that there will be a resumption of buying in the near future. Railroad orders are expected to be good this year and early action is looked for on a number of lists now current. Little activity is noted from the automotive industry, although production of trucks and tractors is going ahead at a rapid rate.

A resumption of full operations in some factories which curtailed output in April is expected about the middle of the month and it is likely that some orders on which suspensions had been asked will be reinstated. Local dealers report fair business for used tools and there is also fair activity in the smaller classes of tools.

The U. S. Engineers' Office, Huntington, W. Va., will receive bids until May 28 for the erection of a power house at Dam No. 32, Ohio River.

The North American Co., New York, has purchased the coal properties of the St. Bernard Mining Co., Madisonville, Ky., which include 25 mines and a central power station. The new company, which will operate under the name of the West Kentucky Coal Co., will have a capitalization of $15,000,000 and it is understood that plans for extensive developments of the properties are now being considered. C. C. Richardson, Sturgis, Ky., is president.

The Cambridge Body Mfg. Co., Cambridge, Ohio, is contemplating the erection of a two-story addition to its present plant now being completed. It will manufacture automobile and truck bodies.

The Mazell Motor Car Co., Third and Bainbridge Streets, Dayton, Ohio, is considering plans for a two-story and basement addition at North Dayton, including alterations and improvements in the present building, estimated to cost $65,000.

The City Council, Jackson, Tenn., is considering the installation of electric-operated pumping equipment in connection with improvements at the municipal waterworks to cost $150,000, for which bonds are being arranged.

The Board of Education, Ludlow Building, Dayton, Ohio, is considering the installation of manual training equipment in the proposed junior high school to be ereceted at Lee and Troy Streets, estimated to cost $460,000, for which plans are being prepared by Bruce Lloyd, architect.

An automatic sub-station, transformers and other equipment will be required by the Tennessee Electric Power Co. in connection with a new 110,000-volt power line to be constructed between Tennessee and Georgia in the vicinity of Ridgeville, Tenn., estimated to cost $140,000. Work is to start immediately.

Manual training and vocational departments will be installed in new grammar school to be erected at Sweetwater, Tenn., estimated to cost $75,000 and for which a general contract has been awarded to J. A. Cox & Son, Knoxville, Tenn.

Cleveland

CLEVELAND, May 5.

THE machine tool market continues very dull, but some manufacturers see indications of a better volume of business during May than last month. Used machinery is still moving better than new tools. Dealers' orders for the most part are coming from small shops and are usually for single machines. No list of any size came out during the week. The market in Detroit is unusually dull because of the absence of buying by the automobile industry. The demand for automatic screw machines in single orders is holding up fairly well. A local manufacturer of turret lathes reports that its orders for April show up better than had been expected and were not much below March. Its business came largely from brass working shops.

The American Roll & Machine Co., Warren, Ohio, recently incorporated with a capital stock of $300,000, will shortly begin the erection of a plant for the manufacture of chilled rolls. Officers of the company are J. C. Manternach, president American Welding & Mfg. Co., Warren, president; J. D. Estabrook, president Sunlight Electric Co., Warren, vice-president, and R. E. Shook, Canton, secretary and treasurer. George G. Brader, N. C. Ralph and R. C. Day, Warren, and W. E Blecker, Canton, are directors.

The S. K. W. Investment Co., 200 Erie Building, Cleveland, will erect a one-story and basement factory at 2014 Elm Street to replace one recently burned.

The Artkraft Sign Co., 1118 South Main Street, Lima, Ohio, has placed a contract for a one-story factory, 60 x 250 ft.

The B. L. Marble Chair Co., Bedford, Ohio, is in the market for a used steam fire pump with capacity of 1000 gal. per min.

Milwaukee

MILWAUKEE, May 5.

FURTHER curtailment in the activities of some foundries and machine shops, principally those identified with the automotive industries, has checked hopes of immediate improvement in demand for machine tools. A little more activity in inquiry the past week, however, has been encouraging. Large industries are doing little buying, except for necessary replacements and most of the business passing is in single tools, or small lots of miscellaneous equipment.

The Smith Engineering Co., 1154 Thirty-second Street, Milwaukee, manufacturer of rock, ore and gravel handling machinery, hoists, etc., is having tentative plans prepared for a new plant on six acres at Lake and Holton Streets. It is unlikely that work will begin before October, and it may be deferred until the spring of 1925.

Chicago interests engaged in manufacturing refrigerating units, represented by Jacob Samuels and Jacob Teller, have practically closed for the acquisition of the plant of the Matthews Mfg. Co., at LaCrosse, Wis., which has been in the hands of a receiver for three years. The Matthews factory was devoted to general woodworking processes and will require considerable retooling. The new owners plan to start production July 1. R. W. Holcombe, secretary-manager LaCrosse Chamber of Commerce, is conducting the negotiations.

The Reliance Foundry Co., Schleisingerville, Wis., plans to remodel its plant to gain additional gray iron casting and core room capacity. Its orders have made necessary enlargement of the working force, and insure full capacity operations until after Sept 1.

The Burgess Battery Co., Madison, Wis., has contracted with A. D. & J. V. Frederickson, local builders, for the erection of its new radio dry cell factory, 120 x 240 ft., one story and part basement. The additional investment will be about $125,000. Dr. C. F. Burgess is president and chief engineer.

The Badger Gray Iron Foundry Co., Milwaukee, has been organized with $20,000 capital stock by Frank E. Shields, 1109 Hayes Avenue, A. L. Butzen and F. A. Graff, to do general foundry work, principally in gray iron castings. Plans are not ready for publication, but it is intimated that an existing shop is to be taken over and enlarged.

The National Blowpipe & Ventilating Co., 489-491 Twelfth Street, Milwaukee, manufacturer of shaving and dust collecting systems, ventilating equipment, and sheet metal work, contemplates the erection of a new and larger factory on a site at Second and Lake Streets. Tentative plans are being prepared for cost estimates, pending which no date will be set for starting work. F. L. Goethel is general manager.

Gulf States

BIRMINGHAM, May 5.

WORK will soon begin on a new plant for the Lone Star Tank Car Co., Fort Worth, Tex., on site of 4 acres recently acquired, comprising a main building and auxiliary structures for the repair of oil tank cars and all-steel freight cars, estimated to cost $85,000 with equipment. W. A. Stuckey is head. The local Chamber of Commerce is interested in the project.

The Sherman Compress Co., Sherman, Tex,, is planning the erection of a power house in connection with its proposed cotton compressing plant, 270 x 350 ft., estimated to cost $80,000. C. G. Comegys is treasurer.

The Bridgeport Machine Co., Wichita, Kan., manufacturer of oil-well equipment, has preliminary plans for a branch factory at Amarillo, Tex., estimated to cost $25,000.

Fire, April 26, destroyed a portion of the oil refinery of the Star Refining & Producing Co., Fort Worth, Tex., with loss estimated at $50,000. It is said that tentative plans are under way for rebuilding.

The Standard Gas Products Co., Birmingham, is considering the erection of a power house at its proposed plant on Twenty-eighth Avenue, estimated to cost $150,000 with equipment.

The Howard Lumber Co., Sarasota, Fla., recently organized with a capital of $200,000, has plans for a one-story woodworking plant, 90 x 100 ft., to cost approximately $50,000. The equipment will be electrically-operated. C. J. Howard is secretary.

The Board of Education, Mobile, Ala., has authorized the installation of a vocational training department in the proposed one- and two-story high school o be erected on Carlin Street, comprising machine shop, electrical department and woodworking shop. It will cost about $250,000.

The City Commission, Terrell, Tex., is planning for enlargement in the municipal electric power plant, including the installation of a complete operating unit, doubling the present output.

The Common Council, Ralls, Tex., plans the installation of electric-operated pumping equipment in connection with a municipal waterworks plant, estimated to cost $50,000, in which amount a bond issue is being arranged.

The Volusia County Board of Public Instruction, DeLand, Fla., plans the installation of a manual training department in the new three-story school estimated to cost $150,000, for which plans will be prepared by W. J. Carpenter, DeLand, architect.

S. P. Coffey, McKinney, Tex., has plans for an automobile service, repair and garage building, 100 x 200 ft., on East Virginia Street, to cost about $90,000.

W. C. Smith, Hialeah, Fla., has purchased a site and will soon begin the erection of a new plant for the manufacture of office and other furniture. It will be 130 x 200 ft., estimated to cost $45,000. A power house will be built.

The Farmer Concrete Works, Inc., St. Petersburg, Fla., will push construction of a new plant on site recently purchased at the Wilson Terminals, Twenty-fourth Street and Seventh Avenue, comprising a main building, 100 x 100 ft., and smaller structures, with total of 18,000 sq. ft. of floor space. A power house will be built. The company has been operating a plant at Bayboro, Fla., and purposes to remove this business to the new location. E. D. Farmer is general manager.

The Crow Coal Co., Jasper, Ala., recently organized, is planning the purchase of electric power and machinery for its local coal mines. Charles B. Crow is president.

The Jacobs Stove Co., Bridgeport, Ala., has acquired the plant and business of the Avondale Stove & Foundry Co., Birmingham, consisting of a number of buildings on a 10-acre tract. The new owner plans the early erection of additional structures and proposes to remove its Bridgeport business to the new location. O. L. Dortch is president.

The Everts Angle Razor Corporation, Fort Worth, Tex., recently organized with a capital of $200,000, will occupy a building leased at Broadway and Jennings Avenue. Equipment will be installed for a daily output of 2000 safety razors and a large quantity of blades. S. H. Jackson is president.

The Tips Engine Works, Inc., Austin, Tex., is reported to have preliminary plans for extensions. The company recently increased its capital from $80,000 to $200,000.

The Texas Pipe Line Co. has awarded contract to Roy Irick, Plainview, Tex., for the construction of a 45-mile oil pipe line, from Hutchinson County to Amarillo, Tex., to cost $50,000. Standard lap weld 6-in. pipe will be required as well as pumping machinery and other equipment.

S. G. Mignon, Mason, Tex., is in the market for equipment for an electric light plant, with auxiliary apparatus.

The Rule Jayton Cotton Oil Co., Stamford, Tex., is in the market for a second-hand cross compound, condensing Corliss engine, 17 x 34 x 48 in.

Pacific Coast

SAN FRANCISCO, April 30.

THE Salt River Valley Water Users' Association, Phoenix, Ariz., is planning the construction of a hydroelectric generating plant at the Horse Mesa Dam on the Salt River, estimated to cost $3,000,000 with equipment and transmission system. C. C. Cragin is chief engineer and general superintendent.

The Common Council, Yakima, Wash, plans for the installation of electric-operated pumping equipment at its proposed waterworks, estimated to cost $500,000.

The Beaumont Fruit Growers' Association, Beaumont, Cal., will erect an ice and cold storage plant at Fifth and Vellie Streets, estimated to cost $100,000 with machinery.

The Board of Education, Los Angeles, will begin the erection of a one-story manual training shop at the central junior high school, to cost $20,000 exclusive of tools and other equipment.

Payne's Bolt Works, Inc., Howard and Main Streets, San Francisco, has awarded a general contract to Mattock & Feasy, 251 Kearny Street, for a one-story addition, estimated to cost $25,000. Nathaniel Blaisdell, 255 California Street, is architect.

Fire, April 24, destroyed a portion of the shipbuilding and repair plant of the Union Construction Co., Oakland, Cal., including machine shop, planing mill, pattern shop and other buildings, with loss estimated at $700,000 including machinery. It is planned to rebuild.

Edwin S. Crane, Post Falls, Idaho, and associates, are organizing a company to build and operate a hydroelectric power plant on the Spokane River, near the city, estimated to cost $125,000.

The Northwestern Electric Co., Portland, Ore., has issued bonds for $700,000, a portion of the fund to be used for extensions in generating plants and system.

The Copper Cliff Co., 424 I. W. Hellman Building, Los Angeles, Cal., is inquiring for a 12-in. rolling mill of three stands, 16-in. roughing I stand, with pinions.

The Southern California Edison Co., Los Angeles, will issue preferred stock in an amount of $10,000,000, the majority of the proceeds to be used for extensions and improvements in generating plants and system.

Fire, April 18, destroyed a portion of the plant of the Gay Engineering Co., 2650 Santa Fe Avenue, Los Angeles, manufacturer of ice and refrigerating machinery, with loss estimated at $35,000. It is planned to rebuild.

The Northwest Can Co., Kelso, Wash., has awarded a general contract to Letsinger & Edmonds, Longview, Wash., for the first unit of a new plant at Longview, one-story, 60 x 160 ft.

The State Highway Department, Sacramento, Cal., R. M. Morton, engineer, has approved plans for a one-story maintenance and repair shop, 90 x 140 ft., at Lankershim, Cal., to cost $37,000 with equipment.

Indiana

INDIANAPOLIS, May 5.

THE Steel Fabricating Corporation, Michigan City, Ind., has selected property at Los Angeles, Cal., for the establishment of a branch fabricating works for its ready-built steel buildings, and plans to begin work early in the summer. It will be used primarily for assembling operations. The Steel Service Corporation, 506 Citizens National Bank Building, Los Angeles, has been organized to handle Pacific Coast business.

The Hughes-Curry Packing Co., 2000 West Eighth Street, Anderson, Ind., will build a two-story cooler and refrigerating building, 50 x 135 ft., in connection with its new packing house, 75 x 145 ft., to cost about $200,000, of which about $100,000 will be used for the first mentioned building and equipment. Henschein & McLaren, 1637 Prairie Avenue, Chicago, are architects. Charles Hughes is president and general manager.

The United States Engineers, Postoffice Building, Cincinnati, will begin the erection of a one-story power house on the Ohio River, at Dam No. 38, near Aurora, Ind.

The General Motors Co., Indianapolis, has leased a building to be erected at 1115 North Capitol Avenue by the Haddon Realty Co., for a new service and repair building.

The American Lawn Mower Co., Monroe and Eighteenth Streets, Muncie, Ind., has preliminary plans for a one-story addition, 50 x 175 ft., estimated to cost $70,000.

Property of the Millholland Machine Co., Indianapolis, will be sold at a public sale on May 14 including machine tools, electrical and other equipment, buildings and land. Bert McBride, 1102 West Twenty-third Street, is receiver in charge.

The Guaranty Junior Corporation, Indianapolis, Albert E. Metzger, head, is having plans drawn for a three-story automobile service, repair and garage building, estimated to cost $110,000 including equipment.

The Board of Education, Huntington, Ind., is considering the installation of manual training equipment in the new high and grade school, estimated to cost $100,000, for which foundations will soon be laid. Griffith and Goodrich, 211 East Perry Court, Fort Wayne, Ind., are architects.

The Indiana Electric Corporation is enlarging the capacity of its Wabash River plant at Terre Haute, Ind., by the installation of a third 20,000 kw. turbine, with the necessary auxiliaries. This plant was originally designed for an ultimate capacity of 200,000 kw. and at the time work was started it was thought that present needs could be met by the output from two 20,000 kw. turbines. Enough business is now in sight, however, to warrant the installation of the third unit. Stone & Webster, Inc., Boston, Mass., who designed and built the original power station, has also designed and is building the extensions to the plant.

The White Mfg. Co., manufacturer of railroad supplies and parts, Goshen, Ind., has plans under way for a new factory. It will be of brick, one story, 50 x 115 ft. Some new equipment will be required.

South Atlantic States

BALTIMORE, May 5.

CONTRACT has been let by the Carriage & Toy Co., Baltimore, to the Consolidated Engineering Co., Calvert Building, for a four-story plant at 636-40 West Pratt Street, to cost $40,000.

Haines, Jones & Cadbury Co., 1136 Ridge Street, Philadelphia, manufacturer of plumbing equipment and fixtures, will soon take bids for a three-story factory branch and distributing works at Kenney and Marshall Streets, Richmond, Va., to cost $85,000. Carneal & Johnson, Richmond, are architects.

The Norfolk Blower & Pipe Corporation, Twenty-second Street and Omohundro Avenue, Norfolk, Va., recently organized, has acquired a local building and will install equipment for a new plant to manufacture dust-collecting systems, stacks and for general metal-working. C. T. Stotts is president, and H. M. Wise, secretary and treasurer.

The Fairbanks Co., Light and Lombard Streets, Baltimore, manufacturer of scales, industrial trucks, etc., with headquarters at 416 Broome Street, New York, has leased a three-story building at Pratt and Concord Streets, totaling 15,000 sq. ft. of floor space, for extensions in its local works and distributing service.

The Wortendyke Mfg. Co., Richmond, Va., manufacturer of paper bags and containers, will soon take bids on a general contract for a new three-story plant, 70 x 142 ft., estimated to cost $250,000 with machinery. Carneal & Johnson, Richmond, are architects.

New interests have acquired control of the Canton Electric Co., Canton, N. C., and have plans under way for expansion and the installation of additional equipment, including hydroelectric power plant on the Pigeon River.

The Common Council, Dawson, Ga., is considering the installation of electric-operated pumping equipment in connection with a municipal waterworks to cost $40,000.

The Board of Directors, North Carolina State College of Agriculture and Engineering, Raleigh, will begin the construction of a new power plant to cost $65,000, for which a contract has been let to J. A. Gardner, Charlotte, N. C. J. E. Sirrine & Co., Greenville, N. C., are architects and engineers.

The Atlantic Coast Realty Co., Winston-Salem, N. C., is desirous of getting in touch with manufacturers of sluice gates for a proposed dam 15 ft. high and 200 ft. long.

The Oak Tire & Rubber Co., Franklinville, Md., recently formed with a capital of $1,000,000, has leased property and will remodel for a new plant for the manufacture of tires, tubes and kindred rubber goods. John M. Ballamy, Govans, Md., is treasurer of the new company in charge. Frank Law is president.

The Carolina Canning Co., Aberdeen, N. C., has inquiries out for shafting, hangers and other transmission apparatus.

The Board of Directors, North Carolina College for Women, Greensboro, N. C., will begin the erection of a one-story power house to cost $45,000.

The Wrightsville & Tennille Railroad Co., Tennille, Ga., contemplates the erection of new locomotive and car repair shops at Dublin, Ga., estimated to cost $90,000. Charles Molony, Tennille, is president.

The Central of Georgia Railway Co., Savannah, Ga., has preliminary plans for the construction of a new coaling station at Millen, Ga., with electrically-operated equipment. A coal storage plant will also be built.

The Board of Trustees, Wake Forest College, Wake Forest, N. C., has authorized the construction of a central steam-operated power house estimated to cost $75,000.

The Board of Aldermen, Bryson City, N. C., is disposing of a bond issue of $100,000, the proceeds to be used for the construction of a municipal hydroelectric generating plant. J. E. Boburn is chairman.

The Common Council, High Point, N. C., is planning for the installation of electric-operated pumping machinery in connection with improvements in the municipal waterworks and sewage systems, estimated to cost $500,000, for which bonds are being arranged. Edward L. Ragan is city secretary.

The Goodwin Automatic Fire Alarm Corporation, Cedar Bluff, Va., has been incorporated with a capital of $150,000 by James E. Goodwin, C. E. Goodwin, J. N. Harmon, Robert W. Harmon and I. O. Perkins. The company plans the construction of a factory.

Canada

TORONTO, May 5.

THE demand for machine tools continues steady, with a good volume for one or two tools to an order. While industrial activities have not improved as much as was expected the outlook is promising. The automotive industry continues an active buyer and garages and repair plants show a keen interest in tools. Buying for replacement purposes is a strong feature of the market.

Smith & Croucher, Bracebridge, Ont., are in the market for a new lathe and upright drill for a machine shop.

The Neutrodyne Radio Sets, 90 St. James Street, Montreal, are interested in the purchase of equipment for the manufacture of radio apparatus. J. C. Martineau is purchasing agent.

J. W. Borneman, Gravenhurst, Ont., is in the market for a bench planer and other woodworking equipment for the manufacture of boats, etc.

The Thunder Bay Paper Co., Port Arthur, Ont., will start work soon on an addition in which the following new equipment will be installed: Three 4-pocket grinders, 6 wet machines, three 600-ton hydraulic presses and three 850-hp. motors.

Smith Brothers, 86 Parliament Street, Toronto, manufacturers of street sprinkler wagons, fire hall wagons, etc., will build an addition to their factory.

The Firestone Tire & Rubber Co., Hamilton, Ont., will build a factory addition to cost $10,000.

The Kirsch Curtain Rod Co., Woodstock, Ont., has started work on a two-story factory to cost $35,000. Equipment will be purchased.

The Sexaur Mfg. Co., 2503 Third Avenue, New York City, manufacturer of plumbing and sanitary supplies, has leased a building at Niagara Falls, Ont., where it will carry on manufacturing operations. It is the intention of the company to erect a permanent plant at Niagara Falls in the near future.

The Harriston Stove Co., Harriston, Ont., is arranging for an addition to its plant.

The Canadian Laundry Machinery Co., Ltd., Toronto, will start work soon on an addition to its plant, for which bids are being received by Ellis & Belfry, 189 Church Street.

The Globe Furniture Co., Waterloo, Ont., is completing arrangements for the erection of a foundry and machine shop, for which equipment will be purchased. John Bahnsen is manager.

The city of Cochrane, Ont., proposes to spend $40,000 on additions to waterworks and sewage plants. J. Tanning is engineer.

The town of Middleton, N. S., proposes to spend $45,000 on a power development plant and dam.

R. P. McKinnon has the general contract for a $60,000 power plant and shipping pier for the Ingonish Gypsum Co., Ingonish, C. B.

Western Canada

The British Columbia Valve Co., Ltd., Vancouver, B. C., contemplates the erection of a plant and brass foundry at North Vancouver, B. C., to cost $250,000.

The Vancouver Smelters, Ltd., Vancouver, B. C., recently incorporated with a capital stock of $5,000,000, will erect a smelting plant. A. Gerald Hodgson is interested.

A company in which C. D. Howe of Port Arthur, Ont., is interested has completed arrangements for the erection of a grain elevator on the Fraser River at New Westminster, B. C., at a cost of $1,000,000.

STEEL AND INDUSTRIAL STOCKS

The range of prices on active steel and industrial stocks from Monday of last week to Monday of this week is as follows:

	Low	High		Low	High
Allis-Chalmers ..	41⅞	43⅝	Inland Steel	33½	33¼
Allis-Chal. pf. ..	90	90	Int. Har.	83½	87
Am. B. S. & Fdy.	78	79	Jones & L'lin pf.	109½	109½
Am. B.S. & F. pf.	108¼	108¼	Lima Loco.	58	60⅞
Am. Can	98⅝	103⅝	Nat.-Acme	5⅞	7⅛
Am. Can pf.....	111⅞	112½	Nat. En. & Stm..	27¼	29
Am. Car & Fdy..	157	159¾	Nat. En. & S. pf.	87	87
Am. Locomotive.	71	74	N. Y. Air Brake	37⅛	41
Am. Loco. pf....	118	118	Otis Steel	7⅝	8½
Am. Radiator ..	95¼	97½	Otis Steel pf....	56	56
Am. Steel Fdries.	34¼	35	Pressed Steel Car	47	49
Bald. Loco.	108⅛	113⅝	Replogle Steel ..	8	8½
Bald. Loco. pf...	113½	114⅝	Republic	44	47⅝
Beth. Steel	47⅝	51¼	Sloss-Sheffield ..	55⅛	57
Beth. Stl. 7% pf.	93	94	Steel of Canada..	72	73¼
Beth. Stl. 8% pf.	107	107½	U. S. Pipe.....	85⅜	94½
Chic. Pneu. Tool.	83	83	U. S. Pipe pf....	88¾	94⅛
Colo. Fuel	32⅞	39⅞	U. S. Steel.....	97⅛	100¼
Crucible Steel ..	50⅝	54⅜	U. S. Steel pf...	119⅝	120¼
Gen. Electric ...	210¾	223½	Vanadium Steel..	22	23¼
Gt. No. Ore Cert.	27¼	27¾	Va. I., C. & Coke	40	41
Gulf States Steel	65¾	70¼	W'house Air Br..	88½	90

Industrial Finances

A foreclosure of the mortgage on the Bath Iron Works, Inc., Bath, Me., shipyards has been recommended by a committee of bondholders, and the Merrill Trust Co., Bangor, Me., will proceed in behalf of about 800 holders of the bonds issued, $1,210,000, on which interest was defaulted last January.

For the quarter ending with March the Atlas Tack Corporation, Fairhaven, Mass., reports net sales of $612,479, cost of sales and operating expenses of $662,476, and net operating loss of $49,997.

The American Steel & Wire Co. of New Jersey has filed a statement dated Dec. 31, 1923, which shows total assets and liabilities of $226,499,448, against $225,157,704 at the close of 1922. With assets appear merchandise and material in stock or in the process of manufacture valued at $50,615,457, against $35,644,743 at the close of 1922. The cash item stands at $7,088,173, against $8,606,260. Notes and accounts receivable stand at $12,049,925, against $15,398,980 for 1922. Among liabilities is $4,120,130 in accounts payable, compared with $9,740,700. Surplus at the close of 1923 was $70,601,370; at the close of 1922 it was $69,321,759.

The Midland Steel Products Co., representing a consolidation of the Parish & Bingham Co., Detroit, Pressed Steel Co. and the Parish Mfg. Co., reports total earnings for 1923 of $1,086,394, equivalent to slightly more than $10 per share on 50,000 shares of no par value common stock. At the close of 1923 the company showed current assets of nearly $4,000,000 against current liabilities of about $750,000, a ratio of better than five to one.

First-quarter statement of the Doehler Die-Casting Co. will show gross sales for the three months ending March 31 of approximately $2,000,000, an annual rate of $8,000,000, which compares with $6,890,000 for 1923.

Net income of the Standard Screw Co., Jersey City, N. J., for the year ended Dec. 31, 1923, amounted to $434,505, after provision for depreciation, taxes, etc. This amount added to previous surplus makes $4,184,340, from which $763,548 was deducted for preferred and common dividends. This reduced the total surplus to $3,420,792. President Philip B. Gale said in his report, "Many of our competitors, to keep their plants operating, have persisted in selling their product at prices neither they nor we could meet without loss and one result is we have not quite so many competitors."

The Ingersoll-Rand Co. has reported net earnings for 1923 of $7,829,592 against $4,982,948 in the previous year. Net income last year was $5,971,138, and in 1922 it was $3,578,262. After allowing for preferred dividends, there remained the equivalent of $24.19 per share on $24,056,300 of common stock in 1923, against $15.71 on $21,800,000 of common in 1922.

Net sales of the National Acme Co. for the quarter ending March 31 were $2,449,676, whereas in the corresponding three months last year they were $2,583,449, a remarkable showing in view of the inactivity in the machine tool trade in general. Net profit for the first quarter, however, was less impressive, being only $71,225, after allowances for bond interest, compared with $339,127 for the like period last year.

The Hurley Machine Co. reports net income for 1923 of $959,014 after expenses, etc., compared with $635,941 in the preceding year. Net sales last year totaled $6,855,088, against $4,857,464. After dividends and sinking fund requirements, surplus for 1923 amounted to $373,462.

Pittsburgh Basing Is Strongly Denounced

(*Concluded from page* 1348)

rolled steel products were usually sold all over the country in accordance with the Pittsburgh plus practice, and the great bulk of such products was sold at uniform prices f.o.b. Pittsburgh or a uniform delivered price. While witnesses for respondents usually testified as to some variations, when the question was put to them as to whether the great bulk of the tonnage sold was not sold at practically uniform prices, they declared, with very few exceptions, that that was the fact. Such testimony is given even by officers of respondent corporations and may be taken as practically conclusive upon this point.

"No practice identical with or substantially similar to the Pittsburgh plus practice, as hereinabove described, which has obtained in the rolled steel industry, is found generally in other lines of industry in the price quotation and sale of products of such lines of industry. Many other industries quote base prices, but circumstances surrounding such industries and the sale of their products as disclosed by the evidence in this proceeding are so essentially different as to make any comparison worthless. Evidence in this proceeding has revealed no close precedent for the Pittsburgh plus practice in any other industry. The practices followed in the marketing of wheat, live stock, hay, zinc and tin touched upon or described by witnesses in this proceeding were shown to be essentially different in vital respects from the Pittsburgh plus practice followed in marketing rolled steel products."

Some Trade Associations Abandon Work

Uncertainty as to Legal Status Causes Highly Unsatisfactory Conditions—Discussion at Cleveland Meeting

WASHINGTON, May 6.—That uncertainty of the legal status of trade associations has caused some of them to abandon their work and threatens to prove harmful to business activities of the country is realized by Government officials here. The fact that some associations have given up their work by reason of fear of litigation has stimulated efforts which are being made quietly by officials in Washington to establish a clear and concise code which can be set up to guide as nearly as possible the work of trade associations. No formal announcement has been made and probably none will be made in the immediate future as to the study being given this much-discussed subject by Government officials. But if the consideration now being given eventuates in a concrete code, a statement, together with the plan, is expected to be made at the earliest practicable time.

The rather voluminous correspondence between Secretary Hoover and former Attorney General Daugherty, in which Mr. Hoover attempted to get a clear conception of the legal status of trade associations, actually left the question more confused than it had been previously, if that were possible. It also had the effect of creating apprehension on the part of some business interests with the result that they have given up trade association work. The contention was made that the so-called informal code set up by Mr. Daugherty was especially restrictive and also was not clear.

One of the principles of Mr. Daugherty was that practically none of the important and essential activities of trade associations would be permissible without danger of legal action unless the information were distributed through a "responsible Government department."

Since the advent of Attorney General Stone into office, discussion has been taken up with a view to seeing if it is possible to go over the entire situation again and to develop a clear understanding for the guidance of trade associations. Government officials would prefer that this be done by legislation, but realize that this is not possible at the present session of Congress even if it can be done at a future session. The alternative, therefore, has been to seek an informal plan through the Department of Justice which necessarily would not have the force of law but could be considered as a reasonably safe plan to follow.

Policies Changing Frequently

Business interests have contended that policies change so frequently that the uncertainty arising has been more injurious than the law itself. Because of this, one plan which Government officials have under discussion is for the institution of a friendly suit against some trade association which has not been faced with litigation of any sort and which supposedly is within the law. Approval by the courts of the work of such an association, it is maintained, would establish a clear cut case and automatically would provide a code by which trade association work could be carried on without danger of legal action.

The question of the uncertainty of the status of trade associations is scheduled for tomorrow at the twentieth annual meeting of the Chamber of Commerce of the United States in Cleveland, by Lew Hahn, Managing Director of the National Retail Dry Goods Association. Mr. Hahn's paper points out that trade associations are so uncertain as to what they may or may not do that many of them have ceased doing anything rather than run the chance of being forced into court as defendants in suits brought by the Department of Justice. It is this exact condition with which Government officials are now dealing in an effort to prevent further abandonment of trade association work and to develop a clear program so that the work may be increased and added cooperation with Government departments be brought about.

Mr. Hahn speaks of the confusion that has arisen from court decisions over trade association work and declares that he had received an impression that "in the recent past at least, the actual state of the law or even the judicial decisions based upon the law seem to be of less importance than the question as to who administers the law—as to who decides upon that suits are to be brought and how these suits are presented."

Difficult to Obtain Opinion

Mr. Hahn added:

"I may do our legal advisers an injustice but it is my impression that it would be difficult if not impossible today to procure a positive opinion from a lawyer which he himself would regard as substantial and which could be used as a safe guide by a trade association in the collection of facts and figures relating to the business of its members. We complain about the law, but I believe that we could adjust ourselves even to more onerous laws than are on the statute books if the administration of these laws were anything but a game of battledore and shuttlecock.

"A few years ago the packers of the United States were subject to a complaint, and by adapting the idea of arbitration perhaps their counsel sat with the representatives of the Department of Justice and evolved what was known as the "consent decree." In other words they agreed upon certain principles to which all of them consented and the court entered this agreement as a decree. This was hailed justly as a real advance in the relations between business men and the Federal law, but within the past month one of the parties to this consent decree has 'reneged'; has attacked the decree as illegal and with a very good chance that they will succeed in having it upset."

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates

	Per Lb.
Bars:	
Refined iron bars, base price	3.49c.
Swedish charcoal iron bars, base	7.00c.
Soft steel bars, base price	3.49c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.59c.
Channels, angles and tees under 3 in. x ¼ in., base	3.49c.
Steel plates, ¼ in. and heavier	3.59c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.55c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.05c.
Toe-calk, ½ x ⅝ in. and larger	4.50c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c.
Squares, flats and hex	4.90c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High-speed steel, 18 per cent tungsten	70c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.34c.
No. 12	4.39c.
No. 14	4.44c.
No. 16	4.54c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.55c. to 4.70c.	.....
Nos. 22 and 24	4.70c. to 4.85c.	5.10c.
No. 26	4.75c. to 4.90c.	5.15c.
No. 28*	4.85c. to 5.00c.	5.25c.
No. 30	5.05c. to 5.20c.	.....

Galvanized

	Per Lb.
No. 14	4.95c. to 5.10c.
No. 16	5.10c. to 5.25c.
Nos. 18 and 20	5.25c. to 5.40c.
Nos. 22 and 24	5.40c. to 5.55c.
No. 26	5.55c. to 5.70c.
No. 28*	5.85c. to 6.00c.
No. 30	6.35c. to 6.50c.

*No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt...	—41	—24	⅛ in. Butt...	— 4	+19
¼ in. Butt...	—46	—32	¼ in. Butt...	—11	+ 9
1-3 in. Butt..	—48	—34	1-1½ in. Butt.	—14	+ 6
2½-6 in. Lap.	—44	—30	2 in. Lap....	— 5	+14
7-8 in. Lap..	—41	—11	2½-6 in. Lap.	— 9	+ 9
9-12 in. Lap.	—34	— 6	7-12 in. Lap..	— 3	+16

Bolts and Screws

Machine bolts, cut thread,
45 and 10 to 45, 10 and 10 per cent off list
Carriage bolts, cut thread,
35 and 10 to 35, 10 and 10 per cent off list
Coach screws, 45 and 10 to 45, 10 and 10 per cent off list
Wood screws, flat head iron,
75, 20 and 10 per cent off list

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.25c. to 4.50c.
Annealed soft	4.50c. to 4.75c.
Galvanized annealed	5.15c. to 5.40c.
Coppered basic	5.15c. to 5.40c.
Tinned soft Bessemer	6.15c. to 6.40c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¾c. to 18¾c.
High brass wire	18¼c. to 19¼c.
Brass rods	15½c. to 16½c.
Brass tube, brazed	25¾c. to 26¾c.
Brass tube, seamless	21½c. to 22½c.
Copper tube, seamless	22¾c. to 23¾c.

Copper Sheets

Sheet copper hot rolled, 21¼c. to 21¾c. per lb. base.
Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin Grade "AAA" Charcoal 14x20	Bright Tin Grade "A" Charcoal 14x20	Coke—14 x 20	Prime	Seconds
		80 lb..	$6.55	$6.30
		90 lb..	6.65	6.40
		100 lb..	6.75	6.50
IC..	$11.75	$9.50	IC.. 7.00	6.75
IX..	13.25	11.50	IX.. 8.25	8.00
IXX..	14.50	12.50	IXX.. 9.50	9.25
IXXX..	15.50	13.75	IXXX.. 10.75	10.50
IXXXX..	16.50	14.75	IXXXX.. 12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	52c.
Bar	55c. to 60c.

Copper

Lake ingot	16 c.
Electrolytic	15½c.
Casting	14½c.

Spelter and Sheet Zinc

Western spelter	8c.
Sheet zinc, No. 9 base, casks	10¾c. open 11½c.

Lead and Solder*

American pig lead	9c. to 9¼c.
Bar lead	12c. to 13c.
Solder, ½ and ½ guaranteed	37c.
No. 1 solder	34c.
Refined solder	30c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic	12c. to 13c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	36c.

Old Metals

The market continues uncertain and values are practically unchanged. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	11.25
Copper, heavy wire	10.50
Copper, light bottoms	9.00
Brass, heavy	6.50
Brass, light	5.00
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.75
No. 1 red brass or composition turnings	8.00
Lead, heavy	6.25
Lead, tea	4.75
Zinc	3.75
Cast aluminum	14.50
Sheet aluminum	15.00